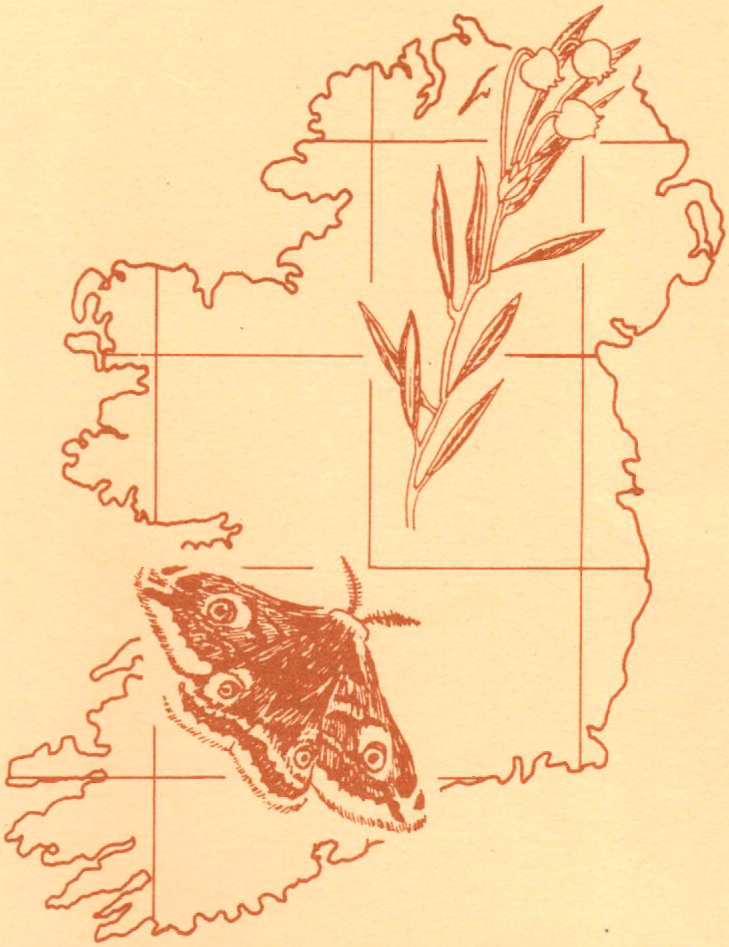
IRISH BIOGEOGRAPHICAL SOCIETY



Bulletin No. 16

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Bull. Ir. biogeog. Soc. No. 16 (1993)

EDITORIAL

1993 has been a very successful year for the Society's publications. Edited by M. J. Costello and K. S. Kelly, the proceedings of the joint Irish Biogeographical Society, the Irish Marine Sciences Association and the Porcupine Society's conference were published as Occasional Publication Number 2. Entitled Biogeography of Ireland: past, present and future, it includes a diverse range of topics. Further details are given elsewhere in this *Bulletin*.

Bulletin 16 fully reflects the varied interests of the Society and there are articles on plants, amphibians, insects and spiders. Changes have been made to improve the appearance of this issue and it is hoped to make further progress next year. On behalf of the Society, I wish to thank our sponsors, the authors, the referees and all those who helped with the publication of this year's *Bulletin*. In particular, Mr J. M. C. Holmes provided invaluable assistance with its production.

Work has already commenced on next year's *Bulletin*. It will contain *inter alia* a very important paper on the Mollusca of Strangford Lough. It is planned to publish the issue early next summer.

J. P. O'Connor
Editor
30 October 1993

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DIPTERA (INSECTA) ATTRACTED TO THE DRAGON'S MOUTH LILY (*DRACUNCULUS VULGARIS* SCHOTT) IN IRELAND

Robert Blackith and Ruth Blackith

Summary

The Dragon's Mouth Lily (*Dracunculus vulgaris* Schott) attracted 24 species of Diptera to the foetid odour of its flowers. Only the smallest flies (three species of Piophilidae and four of Sphaeroceridae) entered the spathe, of which the piophilids were by far the most numerous. A different suite, of larger flies, are attracted to the plants but do not enter the spathes. These results are compared with what is known about flies attracted to the foetid odours from other European Araceae and from the Stinkhorn fungus, *Phallus impudicus* Pers.

Introduction

The Dragon's Mouth Arum Lily (*Dracunculus vulgaris* Schott) is a southern European species about 1m high with chocolate-purple spathe and spadix blooming in Ireland in mid-July but in its native habitats between April and June. It is planted as an ornamental species in Ireland. For about two days the flowers emit a foetid odour reminiscent of the stinkhorn fungus, and, like that fungus, attract a number of species of Diptera normally associated with decomposing animal matter. In Ireland no fruit is produced and reproduction is vegetative; it may be that the flowers are not fertilized here and/or that it is too cold for pollen production.

Methods

Accordingly, 210 flies were hand-netted from a mature plant in our garden at Stepaside, Co. Dublin (O1924), on the 13th and 14th July 1991. Those collected were identified to species using the literature cited by Blackith *et al.* (1991). We noticed that the larger flies (anthomyiids, fanniids, muscids and calliphorids) which were attracted to the plant circled round the flowers but settled only on the leaves; the gap between the spathe and spadix, even in these very large flowers, is dark and narrow and only the smallest flies (piophilids and sphaerocerids) entered. Even these small flies are apparently not temporarily trapped as happens with *Arum maculatum* L. (Roháček *et al.*, 1990) but leave at intervals, apparently spontaneously, to form a swarmlet above the inflorescence when they can be netted, together with flies resting on the leaves, without damaging the plant, so that repeated sampling of a given plant is practicable.

We chose this technique in preference to that used by other authors investigating the dipteran fauna of Araceae, where a bag was dropped over the plant (e.g. Roháček *et al.*, 1990; Drummond and Hammond, 1991). We were interested in all flies attracted to the foetid odour, not only those entering the spathe but also those settling in numbers on the leaves. These latter flies are mainly the larger, more wary, species which readily escape (e.g. Calliphoridae and Muscidae). Capture of these flies enables comparisons to be made with those attracted to stinkhorn fungi where there is no segregation by size.

Results

The results are presented in Table 1.

Table 1. Number of flies taken from *Dracunculus vulgaris*

Calliphoridae	*Calliphora vicina* R.-D.	8
	Calliphora vomitoria (L.)	22
	Protophormia terraenovae (R.-D.)	7
Muscidae	*Eudasyphora cyanella* (Meigen)	8
	Hydrotaea dentipes (Fabr.)	8
	Hydrotaea irritans (Fallén)	45
	Hydrotaea occulta (Meigen)	7
	Hydrotaea ignava (Harris)	1
	Morellia simplex (Loew)	1
	Muscina prolapsa (Harris)	6
Fanniidae	*Fannia canicularis* (L.)	2
	Fannia monilis (Haliday)	22
Anthomyiidae	*Hylemya strenua* R.-D.	1
	Paregle radicum L.	1
Piophilidae	*Stearibia nigriceps* (Meigen)	5
	Prochyliza nigricornis (Meigen)	55
	Parapiophila vulgaris (Fallén)	1
Sphaeroceridae	*Ischiolepta pusilla* (Fallén)	4
	Opalimosina mirabilis (Collin)	1
	Pullimosina heteroneura (Haliday)	1
	Minilimosina fungicola (Haliday)	1
Carnidae	*Meonura neottiophila* Collin	1
Phoridae	*Conicera tibialis* Schmitz	1
Drosophilidae	*Drosophila ? fenestrarum* Fallén	1

Discussion

As might be expected, the sample of flies taken from *Dracunculus* is quite unrepresentative of the species normally present in our garden. In particular, there are at least nine species of Sarcophaginae normally present, none of which came to *Dracunculus*, although they might be expected to be attracted to foetid odours. Külhorn (1974) notes that six species of sarcophagine were attracted to stinkhorns in Germany (including five species occurring in our garden but not attracted to *Dracunculus*). He also records that the same three piophilid species that we recovered from *Dracunculus* were attracted to stinkhorns, excrement and cheese in Germany. In Overgaard Nielsen's (1968) study of Scandinavian stinkhorns almost half of all the Diptera collected were *Polietes lardaria* (Fabr.) whereas this common species was not attracted to our *Dracunculus*. Thus representatives of some dipteran families attracted to stinkhorns are also attracted to *Dracunculus*, others not.

A high proportion of some of the common species taken in our survey, 37 of the 45 *Hydrotaea irritans* (Fallén) and 21 of the 22 *Fannia monilis* (Haliday), were female, suggesting that these species were responding to a possible primary oviposition stimulus. Grensted (1947) found that almost all the psychodids attracted to *A. maculatum* were females.

Sphaerocerids, with 16 species, were the second most numerous group of flies collected from *A. maculatum* in Germany by Roháček *et al.* (1990) (but constituting only 2.8% of the total numbers); they were about as abundant in Grensted's studies of the same species in England and in our *Dracunculus* sample. Two of the species recovered from *A. maculatum* by Roháček *et al.* (1990) were also found in our *Dracunculus*.

The outstanding difference between our results for *Dracunculus* and those quoted by Grensted (1947) and by Roháček *et al.* (1990) for *A. maculatum* is the absence of psychodids in *Dracunculus* inflorescence despite the overwhelming preponderance in those of *A. maculatum*. Nevertheless Knoll (1926) found no psychodids in the inflorescences of *Arum nigrum* Schott, a finding which should urge restraint on the temptation to generalise.

We cannot be sure that *Dracunculus* is pollinated in northern Europe, as it also reproduces vegetatively, but if it is pollinated by insects then piophilids are the most plausible candidates.

Part of the difference between our findings and those of Grensted (1947), together with those of Roháček *et al.* (1990), may be attributed to the fact that *A. maculatum* blooms in late April whereas *Dracunculus* blooms in mid-July, when a somewhat different suite of flies would be available to visit the plants. There are big differences between the suites of flies attracted to different *Arum* species, however, as Drummond and Hammond (1991) found in the eastern Mediterranean. They recovered eight species of sphaerocerid from *A. dioscoridis* Sm. but none from *A. orientale* M.Bieb.

Such results contrast with those of Kullenberg (1953), also in the eastern Mediterranean, who found scatophagids as the only Diptera in the inflorescences of *A. dioscoridis*. He found several species of beetle in such inflorescences. Drummond and Hammond (1991) also found several species of Staphylinidae attracted to the flowers of their *Arum* species, whereas we found none in *Dracunculus*.

Acknowledgements

We are most grateful to John Valentine for identifying our sphaerocerids, and for sending us the paper by Roháček *et al.* and to Frank Jeal for drawing our attention to the dipterous fauna of *Dracunculus*.

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A REVIEW OF THE IRISH NABINAE (INSECTA: HEMIPTERA, NABIDAE)

S. Roth and J. P. O'Connor

Recent surveys of the distribution and ecology of the Nabinae, a zoophage subfamily of the Hemiptera-Heteroptera, have revealed their important role in terrestrial ecosystems such as bogs and dry grasslands (Melber and Henschel, 1981; Roth, unpublished) and their potential use in biological pest control (Lattin, 1989; Voicu, 1986). The distribution of the Irish species is reviewed here, based on published and unpublished data. Notes on their ecology are also included. Halbert (1935) provided the last comprehensive account of the Irish Nabinae.

A total of eight species are known to occur here, compared with twelve in Great Britain and 23 in continental Europe (Pericart, 1987). *Nabis brevis* Scholtz, *N. pseudoferus* Remane, *Stalia boops* (Schiödte) and *Himacerus apterus* (Fabr.) are the four British species unrecorded from Ireland (Table 1). Of these, *N. pseudoferus* is the species most likely to be found here. It possesses long wings and can fly readily.

Ecology

All the Irish species live on plants and hunt other insects. Their habitats consist of a range of different types of grassland ecosystems and very frequently, sympatry occurs. Species belonging to the genera *Nabicula* and *Anaptus* overwinter as eggs while those of *Nabis* and *Aptus* hibernate as adults. In the western part of Europe, the Nabinae have only one generation each year. For most of the species, five larval stages have been reported but some *Nabicula* have only four stages (Pericart, 1987). Larvae and adults may prefer different vegetational strata (e.g. *Nabicula limbata* (Dahlbom)). Within the Nabinae, there is a wide range of wing morphology, ranging from brachypteran (e.g. *Nabicula*

TABLE 1. Occurrence of Nabinae in the British Isles

Species	England/Wales	Scotland	Ireland
Aptus mirmicoides	+	-	+
Anaptus major	+	-	+
Nabicula flavomarginata	+	+	+
Nabicula limbata	+	+	+
Nabicula lineata	+	-	+
Nabis ferus	+	+	+
Nabis rugosus	+	+	+
Nabis ericetorum	+	+	+
Nabis pseudoferus	+	-	-
Nabis brevis	+	-	-
Stalia boops	+	-	-
Himacerus apterus	+	-	-

flavomarginata Scholtz and *Aptus mirmicoides* (O. Costa)) to macropteran species (some *Nabis*). However, intermediates are common. *Nabis ferus* (L.) is relatively longwinged and known for its mobility (Southwood and Leston, 1959). The larvae of *A. mirmicoides* mimic ants but no interaction between them have been observed. Pericart (1987) mentions that this mimicry may be protective.

Distribution in Ireland

The vice-county distribution of the Irish species is given in Table 2. Unpublished data are presented in Appendix 1. Six vice-counties have no records. The group is poorly known in the midlands and the north. By contrast, all the Irish species have been reported from South Kerry and Wicklow. Indeed, the most studied areas are those with easy access to collectors (e.g. Dublin, Wicklow) or with well-known places of special scientific interest (e.g. Galway, Kerry).

Aptus mirmicoides (O. Costa)
This species appears under the synonym *Nabis lativentris* Boheman in earlier publications. It is a widely distributed species, occurring on sandy coasts, sea banks and in dry places inland. *A. mirmicoides* is widespread in Europe.

Anaptus major (A. Costa)
All of Halbert (1935) records were from the east (Dublin) and the south-east but he suggested that the species had a much wider range. This was confirmed by MacNeill (1969a, b) who found *A. major* in Kildare and Clare. The adults are difficult to sweep during the day due to their nocturnal activity (Pericart, 1987) and this has probably contributed to the species being underrecorded. *A. major* is widely distributed in Europe but has not been found in the Alps.

Nabicula flavomarginata (Scholtz)
A common and widespread species, occurring in both dry and marshy places. Little is known about its biology. *N. flavomarginata* is widely distributed in Europe but is more common in the northern and central areas.

Nabicula limbata (Dahlbom)
This species is common and generally distributed. It prefers wetter habitats including marshes. *N. limbata* occurs in most of Europe with the exception of the Alps and the Mediterranean area.

Nabicula lineata (Dahlbom)
Pericart (1987) shows a Dublin record. However this author only used distributional data from Halbert (1935) and may have confused Wicklow and Dublin. It is not therefore included. *N. lineata* is only known from the south-west, Waterford and Wicklow. It is widely distributed in the last named area. Despite a similar ecology to *N. limbata*, its distribution is much more restricted in

both Great Britain and Ireland. Melbert and Henschel (1981) reported habitat differences between the two species in German boglands. *N. lineata* preferred the cut-peat areas while *N. limbata* occurred on the drier *Mollina* community. *N. lineata* is widely but patchily recorded in Europe.

Nabis ferus (L.)
Although there are relatively few Irish records, this species is widely distributed and probably greatly underrecorded. It is able to utilize agricultural land (Southwood and Leston, 1959) and is also a typical bogland insect (Webb, 1986). It has longer wings than the other Irish Nabinae and these should allow it to migrate readily and to occur in more unstable habitats such as crops. *N. ferus* is widespread in Europe with the exception of the Iberian penninsula.

Nabis rugosus (L.)
A common species in grasslands but it avoids very dry areas. *N. rugosus* is widely distributed in Europe with the exceptions of the more northern and southern regions.

Nabis ericetorum Scholtz
This species is a typical heathland and moorland insect. It is probably more widespread than the present records would indicate. It is associated with *Calluna* and *Erica* plant communities (Halbert, 1935; Wagner, 1966; Pericart, 1987). The red colour is caused by its consumption of the homopteran *Ulopa reticulata* (Fabr.), one of its main prey. The possible subspecies status of a pale Irish form is mentioned in Halbert (1935). *N. ericetorum* is a western species in Europe, associated with areas with an Atlantic climate.

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TABLE 2. The Irish vice-county distribution of the Nabinae.

vice-county		Ami	Ama	Nfa	Nlim	Nlin	Nfe	Nr	Ne	
1	SK	+	+	+	+	+	+	+	+	SK
2	NK	+	-	+	+	+	+	+	+	NK
3	WC	+	-	+	+	+	+	+	+	WC
4	MC	+	-	+	+	-	+	-	-	MC
5	EC	+	+	+	+	+	+	+	-	EC
6	WA	+	-	+	+	+	+	+	+	WA
7	ST	+	-	+	+	-	-	-	+	ST

Vice-county		Ami	Ama	Nfa	Nlim	Nlin	Nfe	Nr	Ne	
8	LK	+	-	+	+	-	-	+	-	LK
9	CL	+	+	+	+	-	-	+	+	CL
10	NT	-	-	-	-	-	-	-	-	NT
11	KK	+	+	+	+	-	-	+	+	KK
12	WX	+	+	+	+	-	+	+	-	WX
13	CW	-	-	-	+	-	-	-	+	CW
14	LS	-	-	-	+	-	-	-	-	LS
15	SG	-	-	+	-	-	-	-	-	SG
16	WG	+	-	+	+	-	-	-	-	WG
17	NG	+	-	+	+	-	-	+	+	NG
18	OY	-	-	+	-	-	-	-	+	OY
19	KD	-	+	+	+	-	-	+	+	KD
20	WI	+	+	+	+	+	+	+	+	WI
21	DU	+	+	+	+	-	+	+	+	DU
22	ME	-	-	-	+	-	-	-	-	ME
23	WH	-	-	+	+	-	+	-	-	WH
24	LF	-	-	+	+	-	-	-	-	LF
25	RO	-	-	+	+	-	-	-	-	RO
26	EM	-	-	-	-	-	-	-	-	EM
27	WM	-	-	+	+	-	+	-	-	WM
28	SL	-	-	+	+	-	-	-	-	SL
29	LE	-	-	+	+	-	-	-	-	LE
30	CV	-	-	-	+	-	-	-	-	CV
31	LH	-	-	+	+	-	-	+	-	LH
32	MO	-	-	-	-	-	-	-	-	MO
33	FE	-	-	-	+	-	-	-	-	FE
34	ED	-	-	+	-	-	+	-	-	ED
35	WD	-	-	-	-	-	-	-	-	WD
36	TY	-	-	-	-	-	-	-	-	TY
37	AR	+	-	+	+	-	+	+	-	AR
38	DO	-	-	-	-	-	-	-	-	DO
39	AN	+	-	+	+	-	-	-	-	AN
40	LD	+	-	-	+	-	+	-	-	LD

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APPENDIX 1. Unpublished records of Irish Nabinae

Abbreviations: JPOC - J. P. O'Connor, SR - S. Roth, AWS - A. W. Stelfox. * - new vice-county record.

Aptus mirmicoides (O. Costa)

WEST CORK (3): Garnish Island V9356, 1 July 1985, JPOC. WATERFORD (6): Portally Cove X6798, 8 July 1990, JPOC; Passage East S6811, 13 July 1989, JPOC.

CLARE: Derreen M1204, 23 July 1992, SR.

Nabicula flavomarginata (Scholtz)

WEST GALWAY (16): Letterfrack L7257, 22 July 1982, JPOC.

*OFFALY (18): Clonmacnoise N0231, 18 July 1992, SR.

WESTMEATH (23): Coosan Lough N0554, 2 July 1980, JPOC.

*LONGFORD (24): Longford N1376, 10 August 1992, SR.

*ROSCOMMON (25): Boyle G8202, 10 August 1992, SR.

SLIGO (28): Doonowney G4663, 9 August 1992, SR.

ANTRIM (39): Peters Bridge D1192, 2 August 1992, SR.

Nabicula limbata (Dahlbom)

CLARE (9): Slievecall Mountain R1478, 24 July 1992, SR.

CARLOW (13): Kilcarry, 16 August 1930, AWS.

WESTMEATH (23): Coosan L. N0554, 2 July 1980, JPOC.

*LONGFORD (24): Longford N1376, 10 August 1992, SR.

*ROSCOMMON (25): Boyle G8202, 10 August 1992, SR.

SLIGO (28): Briecklieve Mountain G7512, 10 August 1992, SR.

*CAVAN (30): Woodlawn N4686, 12 September 1991, JPOC.

FERMANAGH (33): Caldwell Castle H0361, 6 August 1992, SR.

ANTRIM (39): Peters Bridge D1192, 2 August 1992, SR.

Nabis rugosus (L.)

SOUTH KERRY (1): Derrynane National Park V7265, 26 June 1992, SR; Lackeen Point V8068, 25 June 1992, SR.

CLARE (9): Ballyeighter R3494, 29 May 1984, JPOC; Derreen M1204, 23 July 1992, SR.

WEXFORD (12): John F. Kennedy Park S7319, 26 March 1989, JPOC.

WICKLOW (20): Cappagh T0981, 23 May 1992, SR.

DUBLIN (21): Blanchardstown O1038, 12 June 1992, SR.

Bull. Ir. biogeog. Soc. No. 16 (1993)

BREEDING HABITATS OF THE COMMON FROG, *RANA TEMPORARIA* L. (ANURA: RANIDAE), IN THE REPUBLIC OF IRELAND

John Kelly Korky and Robert G. Webb

Abstract

Field observations by one of us (JKK) in early 1992 provide general ecological notes on adults, but primarily larvae, of *Rana temporaria* in Ireland. The different kinds of breeding sites (17 in 15 counties), both permanent and temporary, are briefly discussed. This study suggests that tadpoles of *R. temporaria* in Ireland usually have only three (instead of four) upper tooth rows. However, some with four were obtained from southern localities.

Introduction

The European common frog, *Rana temporaria* L., the only frog in Ireland, is widely distributed throughout the island and is a common northern palaearctic amphibian. Boulenger (1897, 1898) described both the tadpoles near London and the distribution and habitat of continental adults. Savage (1935) reviewed ecological factors affecting reproductive behaviour and reported spawning earlier in the south of Ireland than in the north and gave specific dates for the period 1926-1932, with the earliest as 13 February 1928. He determined in a later study (1961) of the species in England, that no consistent effects of temperature, rainfall, humidity or light could be correlated with breeding time. He further speculated that the major factor initiating and orientating breeding migrations was a positive response to an olfactory cue of a water soluble substance from algal blooms that were influenced by rainfall the previous month. Boulenger (1898) reported the size of the spawn as a function of the size of the

female and as generally numbering several thousand eggs in a single large clump. Capula (1989) cited clutch size as averaging 1,000-2,000 eggs. Gibbons and McCarthy (1986) studied the reproductive output of the species in Ireland, with particular reference to body size and age, and determined the mean clutch size to be 1,008 ±20 ova, the mean egg diameter to be 2.32 ±0.01mm, and the mean clutch weight to be 11.62 ±0.37g, plus numerous other reproductive parameters, and characterized Irish frogs as explosive breeders with a greater annual reproductive output than mainland conspecifics. O'Rourke (1970) provided an overview of the species in Ireland, including its taxonomy, probable introductions, and the biology of larvae and adults. Ní Lamhna (1979) presented additional Irish distributional data. The purpose of this study is to (1) document the occurrence of larvae at 17 sites in 15 counties and (2) to provide ecological notes on adults and larvae in the Republic of Ireland based on fieldwork in early 1992.

Methods

The focus of this study is on larvae, although comments on adults are included. Field activities (JKK) in April, May, and June 1992 resulted in the collection of a total of 748 tadpoles (sample numbers varying from 1 to 131) from 17 different sites in the Republic of Ireland. The terms "tadpole" and "larvae" are used interchangeably. Descriptive features follow Altig (1970). Larvae were collected either by seining or using small, fine-mesh hand nets, then killed and preserved in 10% formalin. Larvae were collected under licence and are in the custody of the senior author. These larvae will be placed in the National Museum of Ireland, Dublin, following a definitive analysis of geographic variation similar to that of previous studies (Korky and Webb, 1991, 1992). The museum currently has a total of 25 tadpoles as indicated by the number in parentheses from the following counties

of the Republic: Donegal (15); Cork (3); Dublin (4); Wexford (1) and Northern Ireland: Armagh (2).

Results

Rana temporaria adults are quite cold tolerant and spawn early in the year as icy conditions abate and they emerge from hibernation in the mud of ponds and marshes. Gibbons and McCarthy (1983, 1984) used skeletochronology to determine the life history parameters of the species in Ireland. They found the majority of males bred for the first time at two years and that most females delayed maturity until the third year. Two-year olds were of similar size, but females grew at a faster rate thereafter and achieved larger maximal size than males, and both sexes exhibited a decelerating growth with age. The largest frogs measured in the 1984 study were 82mm SVL (females) and 76mm SVL (males), making the species diminutive compared to some other ranids.

Post-maturation survival did not differ between sexes and was estimated to be 50% annually. The oldest frogs in the study were seven years. However, the life span of the species in captivity is known to be at least 12 years (Wilson, 1950). The dorsal colouration of adults is variable and is reported to relate to habitat background mediated by a visual hormonal mechanism (Bagnara, 1976). Several hundred captive adults from counties Cavan and Monaghan were observed by Korky in a walk-in refrigerator at the Frog Farm, Kells, Co. Meath (Mr Dennis McCarthy, proprietor). Although maintained in translucent plastic trays generally kept in the dark, specimens exhibited three colour morphs - dark brown, dark olive-green, and light gold.

Blackith and Speight (1974) studied the food and feeding habits of the species in bogland habitats in the west of Ireland and described them as unselective and sedentary in their feeding

habits, with prey capture by an adult restricted to a few square metres about that individual. They noted their failure to feed in water, which excludes aquatic organisms from their diet. As a result, adults are highly terrestrial and often found some distance from water and, presumably, move away from spawn sites. Their prey in the 1974 study consisted of Coleoptera by numerical abundance and slugs by wet weight biomass. A lack of food in the gut in March indicated that they do not feed in the spawn period. Savage (1961) also noted frogs between December and March had 60% empty stomachs. Their diet may include episodes of conspecific oophagy (Heusser, 1970).

Blackith and Speight (1974) reported that adults are not found in large numbers and are concentrated in restricted areas, such as ditches in grasslands and the sides of streams in bogs. This agrees with our field observation that transformed frogs are, as a general rule, not openly observed during daytime at suitable-looking habitats. A single gold morph adult was observed only at Tuam, Co. Galway, along with a collection of five postmetamorphic individuals and some tadpoles. Otherwise, adults were not seen at any of the other localities at which larvae were obtained nor at places where collection of larvae was unsuccessful.

Localities and larval samples

The date of collection (all dates are for the year 1992) and brief habitat description of each of the 17 samples is noted below. Blum (1976) reported the species as occurring in continental European mountains as high as 3,000m. Because 99.7% of the land surface of Ireland is about 600m or less (Ryan, 1987), altitude is not a factor limiting distribution. Faris (1944), however, noted altitudinal effects on the ecology of the species on a hill in Co. Cavan, where spawning first occurred at an elevation of 122m and progressed downwards to ponds at 55m. Beattie (1977) noted further

altitudinally correlated effects on the species. The localities (numbers refer to Figure 1) from north to south (Irish grid map reference follows county, then altitude) are listed below.

1) Rossinver, Co. Leitrim, G9346, 128m, Garden of Eden Horticultural Centre, 18 May, n = 131. Man-made, shallow (0.3m deep) impoundment for stock animals on hilltop, usually dry by August, swarming with tadpoles.
2) Colloney, Co. Sligo, G6826, 27m, 19 May, n = 43. Ditch (0.6m deep) along hedgerow in field east of junction of roads N17 and N4.
3) Kilkelly, Co. Mayo, M4491, 85m, 19 May, n = 1. Small stream in culvert under road N17 near town centre. Extensive search upstream for 300m provided no additional larvae. Small fish observed.
4) Eden, Knock, Co. Mayo, M3982, 101m, 18 May, n = 19. Marshy area adjacent to road N17.
5) Killygrogan, Co. Cavan, N5197, 151m, 18 May, n = 39. Low-lying wet field with algal mats (water 2-3cm deep) on west side of road N3. Area receives drainage from hills inland from roadway.
6) Rockfield Road, Kells, Co. Meath, N7374, 76m, 6 April, n = 34. Vernal pond 90m behind residence, usually dry by August. Site of the Frog Farm mentioned in text.
7) Ballgaddy Road, Tuam, Co. Galway, M4253, 46m, 19 May, n = 62. Larvae in algal mats (water 2-3cm deep), as well as five postmetamorphic frogs on wet bog land in mixed forests south of road.
8) Louisa Bridge, Leixlip, Co. Kildare, N9936, 56m, 17 May, n = 27. Marshy area adjacent to road N4.
9) Malahide, Co.Dublin, O2245, 21m, 11 May, n = 26. Artificial garden pond with mud bottom, 0.3m deep.
10) Ballybronell, Fennagh, Co.Carlow, S7766, 101m, 12 June, n = 25. Culvert draining field, usually dry by mid-July or August.
11) Drumgeeley Point, Shannon, Co. Clare. R3960, 9m, 22 May, n =

62. Marshy area below housing estates and flooded pedestrian gravel path on peninsula, 25m, above River Shannon estuary.

12) Three Castles Post Office, Freshford, Co. Kilkenny, S4562, 52m, 15 May, n = 43. Stream on River Nore floodplain near two large spring-fed pools (0.1km west post office). Horsetails (*Equisetum*) and stickleback fish (*Gasterosteus*) present.

13) Lavistown, Co. Kilkenny, S5454, 52m, 15 May, n = 79. Artificial channel on River Nore floodplain, 0.3m deep. Small snails numerous.

14) Grange, Fethard on Sea, Co. Wexford, S8006, 12m, 11 May, n = 14. Tractor wheel ruts (1m long) in field.

15) Kilmacthomas, Co. Waterford, S3804, 58m, 16 May, n = 71. Heavy machinery wheel ruts (0.3m deep) in bog soil of coniferous forest located south of road N25.

16) Muckross Peninsula, Killarney National Park, Co. Kerry, V9485, 26m, 20 May, n = 30. Shallow pond (3m wide) on red sandstone.

17) Castlemartyr, Co. Cork, W9573, 24m, 16 May, n = 42. Meandering shallow stream in mixed forest on south side of road N25 (about 0.1km west of town centre).

Discussion

Rana temporaria is an opportunistic breeder and adaptable to a wide variety of both permanent and temporary spawn sites; these waters are lentic or only slow-moving and seem to generally lack obvious predators. Small fish were noted (at localities 3, 12) with tadpoles and aquatic insects (fish, birds, insects, and mammals may be potential predators), as well as floating and rooted vegetation typically present, although not collected for identification. Larvae generally are cryptic and not observed swimming in open water, which conveys the initial impression of absence at a given locality; disturbed larvae quickly hide in sediment or in vegetation. This negative phototaxic behaviour seemingly selects for the reduction of potential predation

(Duellman and Trueb, 1986). The more permanent habitats, although influenced by rainfall, included extensive field and roadside ditches, streams in coniferous or mixed forests, *Sphagnum* peat bogs, and streams and spring-fed pools on river floodplains. Ephemeral sites included man-made impoundments (for domestic stock) that dry up in summer, low-lying flooded corners of fields, and wheel ruts made by heavy machinery. Some of these shallow transitory sites would seem unlikely to offer sufficient water for survival through metamorphosis.

Locality 11 is clearly within the supratidal zone as defined by Neill (1958), where "water is usually brackish to some degree" and "the zone lies within reach of salt spray, at least during storms." Neill reported *R. temporaria* as one of 52 species or subspecies of amphibians known to "dwell habitually in haline habitats or occasionally invade them" and cited Hardy (1943), who reported breeding of the species in brackish interdune pools in Lancashire, England.

Larvae attain a maximum size of about 45mm total length. Tadpole bodies generally are black dorsally, grey or black ventrally with pink iridescent dots, and have rather clear tail fins with small melanin flecks in the dorsal fin and few, if any, in the ventral fin. The tail musculature has a greyish caudal crest and slightly distinct myomeres. Boulenger (1898: 312-313) reported a tooth row formula of 3-4(2-4)/4(1) and Altig and Johnston 4(2-4)/4(1) based on the observations of Liu (1950: 284-285); preliminary examination of our sample of larvae indicated, typically, three upper rows of teeth 3(2-3)/4(1), but some with 4(2-4)/4(1) were noted as follows: locality 12, one tadpole with a left A-4 tooth row of three tubercles; locality 13, one with a short A-4 row on either side of the median gap; locality 15, one with a short left A-4 row, twelve with a short A-4 row on either side of the median gap; locality 16, three with a short left A-4 row, one with a

short right A-4 row, and three with a short A-4 row on either side of the median gap; locality 17, one with a short left A-4 row, two with a short right A-4 row, and two with a short A-4 row on either side of the median gap. It should be noted that all tadpoles (A-4 on one or both sides) exhibiting the formula 4(2-4)/4(1) were obtained from southern localities only, N =27 of 748 total, or 3.6%.

In regard to amphibian populations worldwide that are reported in decline, *R. temporaria* in Ireland also has suffered to some extent. Cooke (1972) reported a considerable decline over most of England in the 1960s and specifically noted a considerable decrease for the period 1966-1970 at 143 sampling sites in Northern Ireland. The prime cause of the decline seemed to be the loss of suitable wetland habitats owing to modification for human useage. Other factors were road kills, a function of human population density, and the common practice of amateur collecting and the use of these frogs for numerous laboratory studies. Although some local populations may have suffered severe declines, field observations by Korky suggest that adults and larvae can be readily found at many different sites, which reflects an adaptability to a wide variety of habitats.

Local declines may be offset by habitat enhancement (localities 1, 9, 13) and, as reported by Beattie and Tyler-Jones (1992), the addition of limestone ($CaCO_3$) to acid waters to increase pH and calcium concentration and reduce the concentration of toxic aluminium can markedly increase (approximately 70%) breeding success in *R. temporaria*. This liming method could be particularly effective if applied to acidic peat bog and coniferous stream breeding sites (localities 7, 15).

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FIGURE 1: Map of Ireland showing localities of larval samples (numbers correspond to the numbered localities in the text).

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FURTHER RECORDS OF *AMELETUS INOPINATUS* EATON (EPHEMEROPTERA) IN UPLAND STREAMS IN CO. WICKLOW, IRELAND

Mary Kelly-Quinn

Fahy (1973) reported the presence of *Ameletus inopinatus* Eaton in high altitude streams in Co. Wicklow. This was the only Irish record of the arctic-alpine species which is widespread in mountain streams in other parts of western Europe (Gledhill, 1959). In 1990 extensive collections of macroinvertebrates were taken from upland streams in Co. Wicklow as part of an investigation into possible effects of plantation forestry on poorly buffered salmonid streams.

A small number of specimens of *A. inopinatus* were found at six sites (Table 1). All are fast flowing streams above 300m. In June 1992 a more thorough examination of suitable upland habitats confirmed the presence of the species in two other streams. Above the 500m contour *A. inopinatus* was the only mayfly species present and it reached a maximum size and abundance towards the end of May. At all other sites it occurred in small numbers (maximum of one specimen per surber sample) with the more abundant species *Baetis rhodani* (Pictet) or *Siphlonurus lacustris* Eaton.

Specimens of *A. inopinatus* have been deposited in the National Museum of Ireland.

Acknowledgement

Thanks are expressed to Dr J.O'Connor, National Museum of Ireland, for confirming the identification of *Ameletus inopinatus*.

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TABLE 1. Records of *Ameletus inopinatus* in Co.Wicklow.

Year	Site	National Grid Reference	Altitude (m)
1990	Glendasan River	T086998	310
	Cloghoge River	O143099	400
	Inchavore River	O106065	410
		O104055	400
	Glenmacnass River	O113030	350
	Glencree River	O144177	320
1992	Ballinagee Brook	O051038	390
	Annalecka Brook	O065030	450
		O064034	540
		O072037	500
		O066026	410

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CHECKLIST OF THE SPIDERS OF IRELAND

Damian M. McFerran and Helena C. G. Ross

Introduction

It is over 90 years since Carpenter published a list of the spiders of Ireland (Carpenter, 1898). Although this paper provides a useful historical picture of the distribution of the Irish species, additions to the Irish list, nomenclature and taxonomic changes have resulted in it becoming outdated. Such recent published information as does exist takes the form of locality lists and short notes widely scattered in the literature and passing reference in works on the spider fauna of the British Isles as a whole. The following paper provides an updated list of the spider species for students of the Irish fauna and includes one previously unrecorded species, *Satilatlas britteni* (Jackson). We have accepted only recently determined material as being definitely Irish but have listed all recorded species, the majority of which require confirmation. It is hoped that the publication of this imperfect listing will encourage verification of those species known only from the literature. Many of these are no doubt represented in the national collections but time has not permitted their examination. Full data referring to the spiders in the McFerran collection are stored on the Recorder database at the Ulster Museum (+).

The provisional checklist of Irish spiders now includes 368 species, 268 of which require confirmation.

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SYSTEMATIC LIST

Family ATYPIDAE
Atypus affinis Eichwald, 1830

Family AMAUROBIIDAE
Amaurobius fenestralis (Stroem, 1768)
Amaurobius similis (Blackwall, 1861)
Amaurobius ferox (Walckenaer, 1830)

Family DICTYNIDAE
Dictyna arundinacea (Linnaeus, 1758)
Dictyna uncinata Thorell, 1856
Dictyna latens (Fabricius, 1775)
Argenna subnigra (O. P.-Cambridge, 1861)

Family ULOBORIDAE
Hyptiotes paradoxus (C. L. Koch, 1834)

Family OONOPIDAE
Oonops pulcher Templeton, 1835

Family DYSDERIDAE
Dysdera erythrina (Walckenaer, 1802)
Dysdera crocata C. L. Koch, 1838
Harpactea hombergi (Scopoli, 1763)

Family SEGESTRIIDAE
Segestria senoculata (Linnaeus, 1758)

Family SCYTODIDAE
Scytodes thoracica Latreille, 1804

Family PHOLCIDAE
Pholcus phalangioides (Fuesslin, 1775)

Family GNAPHOSIDAE
Drassodes lapidosus (Walckenaer, 1802)
Drassodes cupreus (Blackwall, 1834)
Haplodrassus signifer (C. L. Koch, 1839) +
Scotophaeus blackwalli (Thorell, 1871) +
Zelotes electus (C. L. Koch, 1839)
Zelotes latreillei (Simon, 1878)
Zelotes apricorum (L. Koch, 1876)
Zelotes longipes (L. Koch, 1866)
Drassyllus lutetianus (L. Koch, 1866)
Drassyllus pusillus (C. L. Koch, 1833)
Micaria pulicaria (Sundevall, 1832)

Family CLUBIONIDAE
Clubiona reclusa O. P.-Cambridge, 1863
Clubiona stagnatilis Kulczynski, 1897
Clubiona pallidula (Clerck, 1757)
Clubiona phragmitis C. L. Koch, 1843
Clubiona terrestris Westring, 1851
Clubiona neglecta O. P.-Cambridge, 1862
Clubiona lutescens Westring, 1851
Clubiona comta C. L. Koch, 1839
Clubiona brevipes Blackwall, 1841
Clubiona trivialis C. L. Koch, 1843 +
Clubiona juvenis Simon, 1878
Clubiona diversa O. P.-Cambridge, 1862 +
Clubiona subtilis L. Koch, 1867
Cheiracanthium erraticum (Walckenaer, 1802)
Cheiracanthium virescens (Sundevall, 1833)
Phrurolithus festivus (C. L. Koch, 1835)

Family LIOCRANIDAE
Agroeca proxima (O. P.-Cambridge, 1871) +
Agraecina striata (Kulczynski, 1882)
Scotina celans (Blackwall, 1841)
Scotina gracilipes (Blackwall, 1859)
Liocranum rupicola (Walckenaer, 1830)

Family ZORIDAE
Zora spinimana (Sundevall, 1833)

Family ANYPHAENIDAE
Anyphaena accentuata (Walckenaer, 1802)

Family HETEROPODIDAE
Micrommata virescens (Clerck, 1757)

Family THOMISIDAE
Misumena vatia (Clerck, 1757)
Xysticus cristatus (Clerck, 1757) +
Xysticus audax (Schrank, 1803)
Xysticus erraticus (Blackwall, 1834)
Xysticus lanio C. L. Koch, 1835
Xysticus ulmi (Hahn, 1831)
Xysticus sabulosus (Hahn, 1832)
Xysticus luctuosus (Blackwall, 1836)
Oxyptila sanctuaria (O. P.-Cambridge, 1871)
Oxyptila praticola (C. L. Koch, 1837)
Oxyptila trux (Blackwall, 1846) +
Oxyptila atomaria (Panzer, 1801)
Oxyptila brevipes (Hahn, 1826)

Family PHILODROMIDAE
Philodromus dispar Walckenaer, 1826
Philodromus aureolus (Clerck, 1757)

Philodromus cespitum (Walckenaer, 1802)
Philodromus emarginatus (Schrank, 1803)
Tibellus maritimus (Menge 1875)
Tibellus oblongus (Walckenaer, 1802)

Family SALTICIDAE
Salticus scenicus (Clerck, 1757)
Salticus cingulatus (Panzer, 1797)
Heliophanus cupreus (Walckenaer, 1802)
Heliophanus flavipes (Hahn, 1832)
Marpissa nivoyi (Lucas, 1846)
Neon reticulatus (Blackwall, 1853)
Euophrys frontalis (Walckenaer, 1802)
Euophrys petrensis C. L. Koch, 1837
Euophrys erratica (Walckenaer, 1826)
Euophrys lanigera (Simon, 1871)
Sitticus caricis (Westring, 1861)
Sitticus floricola (C. L. Koch, 1837)
Evarcha falcata (Clerck, 1757)

Family LYCOSIDAE
Pardosa agricola (Thorell, 1856)
Pardosa arenicola (O. P.-Cambridge, 1875)
Pardosa purbeckensis F. O. P.-Cambridge, 1895
Pardosa monticola (Clerck, 1757) +
Pardosa palustris (Linnaeus, 1758)
Pardosa pullata (Clerck, 1757) +
Pardosa prativaga (L. Koch, 1870)
Pardosa amentata (Clerck, 1757) +
Pardosa nigriceps (Thorell, 1856) +
Pardosa lugubris (Walckenaer, 1802) +
Alopecosa pulverulenta (Clerck, 1757) +
Alopecosa barbipes (Sundevall, 1833) +
Trochosa ruricola (Degeer, 1778)

Trochosa terricola Thorell, 1856 +
Trochosa spinipalpis (F. O. P.-Cambridge, 1895)
Arctosa perita (Latreille, 1799)
Arctosa leopardus (Sundevall, 1833)
Arctosa cinerea (Fabricius, 1777)
Pirata piraticus (Clerck, 1757) +
Pirata hygrophilus Thorell, 1872
Pirata uliginosus (Thorell, 1856)
Pirata latitans (Blackwall, 1841)
Pirata piscatorius (Clerck, 1757)

Family PISAURIDAE
Pisaura mirabilis (Clerck, 1757) +
Dolomedes fimbriatus (Clerck, 1757)

Family ARGYRONETIDAE
Argyroneta aquatica (Clerck, 1757)

Family AGELENIDAE
Agelana labyrinthica (Clerck, 1757)
Textrix denticulata (Olivier, 1789)
Tegenaria saeva Blackwall, 1844
Tegenaria atrica C. L. Koch, 1843
Tegenaria parietina (Fourcroy, 1785)
Tegenaria domestica (Clerck, 1757)
Cryphoeca silvicola (C. L. Koch, 1834)

Family HAHNIIDAE
Antistea elegans (Blackwall, 1841) +
Hahnia montana (Blackwall, 1841)
Hahnia nava (Blackwall, 1841)
Hahnia helveola Simon, 1875
Hahnia pusilla C. L. Koch, 1841

Family MIMETIDAE
Ero cambridgei Kulczynski, 1911
Ero furcata (Villers, 1789) +

Family THERIDIIDAE
Episinus angulatus (Blackwall, 1836)
Episinus truncatus Latreille, 1809
Euryopis flavomaculata (C. L. Koch, 1836) +
Dipoena inornata (O. P.-Cambridge, 1861)
Dipoena tristis (Hahn, 1833)
Dipoena melanogaster (C. L. Koch, 1837)
Crustulina sticta (O. P.-Cambridge, 1861)
Steatoda phalerata (Panzer, 1801)
Steatoda bipunctata (Linnaeus, 1758)
Steatoda grossa (C. L. Koch, 1838)
Anelosimus vittatus (C. L. Koch, 1836)
Achaearanea lunata (Clerck, 1757)
Achaearanea riparia (Blackwall, 1834)
Achaearanea tepidariorum (C. L. Koch, 1841)
Theridion sisyphium (Clerck, 1757)
Theridion impressum L. Koch, 1881
Theridion varians Hahn, 1833
Theridion melanurum Hahn, 1831
Theridion blackwalli O. P.-Cambridge, 1871
Theridion tinctum (Walckenaer, 1802)
Theridion instabile O. P.-Cambridge, 1871
Theridion bellicosum Simon, 1873
Theridion bimaculatum (Linnaeus, 1767)
Theridion pallens Blackwall, 1834
Enoplognatha ovata (Clerck, 1757)
Enoplognatha thoracica (Hahn, 1831)
Robertus lividus (Blackwall, 1836) +
Robertus arundineti (O. P.-Cambridge, 1871) +
Robertus neglectus (O. P.-Cambridge, 1871)

Pholcomma gibbum (Westring, 1851)
Theonoe minutissima (O. P.-Cambridge, 1879) +

Family NESTICIDAE
Nesticus cellulanus (Clerck, 1757)

Family TETRAGNATHIDAE
Tetragnatha extensa (Linnaeus, 1758)
Tetragnatha pinicola L. Koch, 1870
Tetragnatha montana Simon, 1874
Tetragnatha obtusa C. L. Koch, 1837
Tetragnatha nigrita Lendl, 1886
Tetragnatha striata L. Koch, 1862
Pachygnatha clercki Sundevall, 1823 +
Pachygnatha listeri Sundevall, 1830
Pachygnatha degeeri Sundevall, 1830 +

Family METIDAE
Meta segmentata (Clerck, 1757)
Meta mengei (Blackwall, 1869)
Meta merianae (Scopoli, 1763)
Meta menardi (Latreille, 1804)
Zygiella x-notata (Clerck, 1757)
Zygiella atrica (C. L. Koch, 1845)

Family ARANEIDAE
Gibbaranea gibbosa (Walckenaer, 1802)
Araneus diadematus Clerck, 1757
Araneus quadratus Clerck, 1757
Larinioides cornutus (Clerck, 1757)
Larinioides sclopetaruis (Clerck, 1757)
Larinioides patagiatus (Clerck, 1757)
Nuctenea umbratica (Clerck, 1757)
Agalenatea redii (Scopoli, 1763)

Neoscona adianta (Walckenaer, 1802)
Atea triguttata (Fabricius, 1775)
Araniella cucurbitina (Clerck, 1757) +
Araniella opistographa (Kulczynski, 1905)
Hypsosinga pygmaea (Sundevall, 1832)
Hypsosinga sanguinea (C. L. Koch, 1844)
Mangora acalypha (Walckenaer, 1802)
Cyclosa conica (Pallas, 1772)

Family THERIDIOSOMATIDAE
Theridiosoma gemmosum (L. Koch, 1877)

Family LINYPHIIDAE
Ceratinella brevipes (Westring, 1851) +
Ceratinella brevis (Wider, 1834)
Ceratinella scabrosa (O. P.-Cambridge, 1871)
Walckenaeria acuminata Blackwall, 1833 +
Walckenaeria antica (Wider, 1834) +
Walckenaeria cucullata (C. L. Koch, 1836)
Walckenaeria nodosa O. P.-Cambridge, 1873
Walckenaeria atrotibialis (O. P.-Cambridge, 1878) +
Walckenaeria capito (Westring, 1861)
Walckenaeria nudipalpis (Westring, 1851) +
Walckenaeria monoceros (Wider, 1834)
Walckenaeria corniculans (O. P.-Cambridge, 1875)
Walckenaeria unicornis O. P.-Cambridge, 1861
Walckenaeria kochi (O. P.-Cambridge, 1872) +
Walckenaeria clavicornis (Emerton, 1882) + (McFerran, in press)
Walckenaeria cuspidata Blackwall, 1833 +
Walckenaeria vigilax (Blackwall, 1853) +
Dicymbium nigrum (Blackwall, 1834) +
Dicymbium brevisetosum Locket, 1962 +
Dicymbium tibiale (Blackwall, 1836) +
Entelecara erythropus (Westring, 1851)

Entelecara omissa O. P.-Cambridge, 1902
Entelecara errata O. P.-Cambridge, 1913
Moebelia penicillata (Westring, 1851)
Hylyphantes graminicola (Sundevall, 1830)
Gnathonarium dentatum (Wider, 1834)
Tmeticus affinis (Blackwall, 1855)
Gongylidium rufipes Linnaeus, 1758
Dismodicus bifrons (Blackwall, 1841) +
Hypomma bituberculatum (Wider, 1834) +
Hypomma fulvum (Bösenberg, 1902)
Hypomma cornutum (Blackwall, 1833)
Metopobactrus prominulus (O. P.-Cambridge, 1872) +
Baryphyma gowerense (Locket, 1965)
Baryphyma trifrons (O. P.-Cambridge, 1863) +
Baryphyma duffeyi (Millidge, 1954)
Gonatium rubens (Blackwall, 1833) +
Gonatium rubellum (Blackwall, 1841)
Maso sundevalli (Westring, 1851)
Peponocranium ludicrum (O. P.-Cambridge, 1861) +
Pocadicnemis pumila (Blackwall, 1841) +
Pocadicnemis juncea Locket and Millidge, 1953
Hypselistes jacksoni (O. P.-Cambridge, 1902) +
(McFerran, in press)
Oedothorax gibbosus (Blackwall, 1841) +
Oedothorax fuscus (Blackwall, 1834) +
Oedothorax agrestis (Blackwall, 1853)
Oedothorax retusus (Westring, 1851) +
Oedothorax apicatus (Blackwall, 1850)
Trichopterna thorelli (Westring, 1861) +
Pelecopsis mengei (Simon, 1884)
Pelecopsis parallela (Wider, 1834)
Pelecopsis nemoralis (Blackwall, 1841) +
Silometopus elegans (O. P.-Cambridge, 1872) +
Silometopus ambiguus (O. P.-Cambridge, 1905)

Silometopus reussi (Thorell, 1871)
Mecopisthes peusi Wunderlich, 1972
Cnephalocotes obscurus (Blackwall, 1834) +
Trichoncus saxicola (O. P.-Cambridge, 1861)
Ceratinopsis stativa (Simon, 1881)
Evansia merens O. P.-Cambridge, 1900
Tiso vagans (Blackwall, 1834) +
Troxochrus scabriculus (Westring, 1851)
Minyriolus pusillus (Wider, 1834)
Tapinocyba praecox (O. P.-Cambridge, 1873)
Tapinocyba pallens (O. P.-Cambridge, 1872) +
Tapinocyba insecta (L. Koch, 1869)
Satilatlas britteni (Jackson, 1913) +
New to Ireland. One male of *S. britteni* was recorded on the 3 June 1991 in Bolusty Beg, Lough Navar Forest, Co. Fermanagh (H051571). It was taken in blanket bog by A. Cameron. This small spider (males 1.6-1.8 mm; females 1.8-2mm) has been reported from two rather different habitats, *Sphagnum* bog and saltmarsh. *S. britteni* is rare in Britain and usually occurs in marshy habitats (Locket and Millidge, 1953). It has been recorded from a small number of localities, sometimes abundantly, in the north and south of England, north Wales and Scotland. Adults are found from March to June.
Thyreosthenius parasiticus (Westring, 1851)
Monocephalus fuscipes (Blackwall, 1836) +
Monocephalus castaneipes (Simon, 1884)
Lophomma punctatum (Blackwall, 1841) +
Saloca diceros (O. P.-Cambridge, 1871)
Gongylidiellum vivum (O. P.-Cambridge, 1875) +
Gongylidiellum latebricola (O. P.-Cambridge, 1871) +
Gongylidiellum murcidum (Simon, 1884)
Micrargus herbigradus (Blackwall, 1854) +
Micrargus subaequalis (Westring, 1851)
Erigonella hiemalis (Blackwall, 1841) +

Erigonella ignobilis (O. P.-Cambridge, 1871)
Savignia frontata (Blackwall, 1833) +
Diplocephalus cristatus (Blackwall, 1833)
Diplocephalus permixtus (O. P.-Cambridge, 1871) +
Diplocephalus latifrons (O. P.-Cambridge, 1863)
Diplocephalus picinus (Blackwall, 1841)
Araeoncus humilis (Blackwall, 1841)
Araeoncus crassiceps (Westring, 1861) +
Lessertia dentichelis (Simon, 1884)
Typhochrestus digitatus (O. P.-Cambridge, 1872) +
Diplocentria bidentata (Emerton, 1882)
Erigone dentipalpis (Wider, 1834) +
Erigone atra Blackwall, 1833 +
Erigone promiscua (O. P.-Cambridge, 1872)
Erigone arctica (White, 1852)
Erigone longipalpis (Sundevall, 1830)
Erigone capra (Simon, 1884)
Erigone welchi Jackson, 1911
Rhaebothorax morulus (O. P.-Cambridge, 1873) +
Latithorax faustus (O. P.-Cambridge, 1900)
Donacochara speciosa (Thorell, 1875)
Leptorhoptrum robustum (Westring, 1851) +
Drepanotylus uncatus (O. P.-Cambridge, 1873) +
Leptothrix hardyi (Blackwall, 1850) +
Hilaira excisa (O. P.-Cambridge, 1871) +
Hilaira frigida (Thorell, 1872)
Hilaira pervicax Hull, 1908 +
Halorates reprobus (O. P.-Cambridge, 1879)
Carorita paludosa Duffey, 1971
Asthenargus paganus (Simon, 1884)
Jacksonella falconeri (Jackson, 1908)
Ostearius melanopygius (O. P.-Cambridge, 1879)
Aphileta misera (O. P.-Cambridge, 1882)
Porrhomma pygmaeum (Blackwall, 1834)

Porrhomma convexum (Westring, 1861)
Porrhomma rosenhaueri (L. Koch, 1872)
Porrhomma pallidum Jackson, 1913 +
Porrhomma campbelli F. O. P.-Cambridge, 1894
Porrhomma errans (Blackwall, 1841)
Porrhomma egeria Simon, 1884
Agyneta subtilis (O. P.-Cambridge, 1863) +
Agyneta conigera (O. P.-Cambridge, 1863)
Agyneta decora (O. P.-Cambridge, 1871) +
Agyneta cauta (O. P.-Cambridge, 1902) +
Agyneta olivacea (Emerton, 1882) +
Meioneta innotabilis (O. P.-Cambridge, 1863)
Meioneta rurestris (C. L. Koch, 1836) +
Meioneta saxatilis (Blackwall, 1844) +
Meioneta beata (O. P.-Cambridge, 1906)
Meioneta gulosa (L. Koch, 1869) + (McFerran, in press)
Micronета viaria (Blackwall, 1841)
Centromerus sylvaticus (Blackwall, 1841)
Centromerus prudens (O. P.-Cambridge, 1873)
Centromerus arcanus (O. P.-Cambridge, 1873)
Centromerus dilutus (O. P.-Cambridge, 1875)
Centromerus persimilis (O. P.-Cambridge, 1912)
Tallusia experta (O. P.-Cambridge, 1871) +
Centromerita bicolor (Blackwall, 1833) +
Centromerita concinna (Thorell, 1875) +
Oreonetides vaginatus (Thorell, 1872)
Saaristoa abnormis (Blackwall, 1841) +
Saaristoa firma (O. P.-Cambridge, 1905) +
Macrargus rufus (Wider, 1834)
Bathyphantes approximatus (O. P.-Cambridge, 1871)
Bathyphantes gracilis (Blackwall, 1841) +
Bathyphantes parvulus (Westring, 1851)
Bathyphantes nigrinus (Westring, 1851)
Bathyphantes setiger F. O. P.-Cambridge, 1894

Kaestneria dorsalis (Wider, 1834)
Kaestneria pullata (O. P.-Cambridge, 1863)
Diplostyla concolor (Wider, 1834)
Poeciloneta variegata (Blackwall, 1841)
Drapetisca socialis (Sundevall, 1833)
Tapinopa longidens (Wider, 1834) +
Floronia bucculenta (Clerck, 1757)
Taranucnus setosus (O. P.-Cambridge, 1863)
Labulla thoracica (Wider, 1834)
Stemonyphantes lineatus (Linnaeus, 1758)
Bolyphantes luteolus (Blackwall, 1833) +
Lepthyphantes nebulosus (Sundevall, 1830)
Lepthyphantes leprosus (Ohlert, 1865)
Lepthyphantes minutus (Blackwall, 1833)
Lepthyphantes alacris (Blackwall, 1853) +
Lepthyphantes whymperi F. O. P.-Cambridge, 1894
Lepthyphantes obscurus (Blackwall, 1841) +
Lepthyphantes tenuis (Blackwall, 1852) +
Lepthyphantes zimmermanni Bertkau, 1890 +
Lepthyphantes cristatus (Menge, 1866) +
Lepthyphantes mengei Kulczynski, 1887 +
Lepthyphantes flavipes (Blackwall, 1854) +
Lepthyphantes tenebricola (Wider, 1834) +
Lepthyphantes ericaeus (Blackwall, 1853) +
Lepthyphantes pallidus (O. P.-Cambridge, 1871)
Helophora insignis (Blackwall, 1841)
Linyphia triangularis (Clerck, 1757) +
Linyphia hortensis Sundevall, 1830
Linyphia montana (Clerck, 1757)
Linyphia clathrata Sundevall, 1830
Linyphia peltata Wider, 1834 +
Microlinyphia pusilla (Sundevall, 1830) +
Microlinyphia impigra (O. P.-Cambridge, 1871)
Allomengea scopigera (Grube, 1859) +
Allomengea vidua (L. Koch, 1879)

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APPENDIX 1.

Investigation of the distribution maps of the British and Irish fauna (Locket, Millidge and Merrett, 1974) suggests that, given their British range, status and habitat requirements, the species listed below may well occur in Ireland. They are given here to encourage informed effort.

DICTYNIDAE: *Dictyna pusilla* Thorell, 1856; *Lathys humilis* (Blackwall, 1855); OONOPIDAE: *Oonops domesticus* de Dalmas, 1916; PHOLCIDAE: *Psilochorus simoni* (Berland, 1911); GNAPHOSIDAE: *Drassodes pubescens* (Thorell, 1856); *Haplodrassus silvestris* (Blackwall, 1833); CLUBIONIDAE: *Clubiona corticalis* (Walckenaer, 1802); *Clubiona caerulescens* L. Koch, 1867; LIOCRANIDAE: *Agrocea brunnea* (Blackwall, 1833); ZORIDAE: *Zora nemoralis* (Blackwall, 1861); THOMISIDAE: *Diaea dorsata* (Fabricius, 1777); *Xysticus kochi* Thorell, 1872; *Xysticus bifasciatus* C. L. Koch, 1837; PHILODROMIDAE: *Philodromus histrio* (Latreille, 1819); *Thanatus striatus* C. L. Koch, 1845; SALTICIDAE: *Ballus chalybeius* (Walckenaer, 1802); *Euophrys aequipes* (O. P.-Cambridge, 1871); *Sitticus pubescens* (Fabricius, 1775); LYCOSIDAE: *Pardosa proxima* (C. L. Koch, 1847); *Xerolycosa miniata* (C. L. Koch, 1834); AGELENIDAE: *Tegenaria agrestis* (Walckenaer, 1802); *Coelotes terrestris* (Wider, 1834); *Cicurina cicur* (Fabricius, 1793); THERIDIIDAE: *Crustulina guttata* (Wider, 1834); *Theridion pictum* (Walckenaer, 1802); *Theridion simile* C. L. Koch, 1836; ARANEIDAE: *Araneus marmoreus* Clerck, 1757; *Atea sturmi* (Hahn, 1831); *Hypsosinga albovittata* (Westring, 1851); *Singa hamata* (Clerck, 1757); *Cercidia prominens* (Westring, 1851); LINYPHIDAE: *Walckenaeria dysderoides* (Wider, 1834); *Walckenaeria obtusa* Blackwall, 1836; *Entelecara acuminata* (Wider, 1834); *Entelecara flavipes* (Blackwall, 1834); *Baryphyma pratense* (Blackwall, 1861); *Microctenonyx subitaneus* (O. P.-Cambridge, 1875); *Notioscopus sarcinatus* (O. P.-Cambridge, 1872); *Panamamops sulcifrons* (Wider,

1834); *Scotinotylus evansi* (O. P.-Cambridge, 1894); *Milleriana inerrans* (O. P.-Cambridge, 1885); *Porrhomma montanum* Jackson, 1913; *Agyneta ramosa* Jackson, 1912; *Maro minutus* O. P.-Cambridge, 1906; *Sintula corniger* (Blackwall, 1856); *Bolyphantes alticeps* (Sundevall, 1832); *Lepthyphantes expunctus* (O. P.-Cambridge, 1875).

APPENDIX 2.

The following Irish species are recorded in volume 3 of the *British Red Data Books* (Bratton, 1991).

Family ULOBORIDAE
Hyptiotes paradoxus (C. L. Koch, 1834)
This species, mainly found on yew or in the vicinity of yew trees and also other evergreens (especially box and holly), is known from fewer than 10 sites. The only record in Ireland is from Co. Cork.

Family SALTICIDAE
Sitticus floricola (C. L. Koch, 1837)
This species is only known from one swampy locality in Cheshire, two areas in Ireland (Cos. Galway and Tipperary) and one in Scotland.

Family THERIDIIDAE
Dipoena melanogaster (C. L. Koch, 1837)
This species occurs on gorse and other bushes. In Ireland, only known from one specimen which was recorded on Scots pine *Pinus sylvestris* in Co. Limerick.

Family LINYPHIIDAE

Baryphyma duffeyi (Millidge, 1954)

Baryphyma gowerense (Locket, 1965)

Both species have been recorded only from a salt-marsh in Co.Kerry.

Carorita paludosa Duffey, 1971

In *Sphagnum* and litter and among cut grass and sedge and in marshy areas. Recorded from two sites in Norfolk, one in Somerset and one in Co. Clare.

Porrhomma rosenhaueri (L. Koch, 1872)

This species is an extensive cave-dweller and in Ireland it has been recorded only from Mitchelstown caves, Co. Tipperary.

Centromerus persimilis (O. P.-Cambridge, 1912)

This species is known from only two localities in the British Isles, Co. Carlow and Northumberland. The sites of the records and the size and colour of the specimens have suggested that this species may live in a subterranean habitat.

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PSEUDOPLECTANIA SPHAGNOPHILA (PERS.) KREISEL (ASCOMYCOTINA: SARCOSOMATACEAE) IN IRELAND

H. F. Fox and J. Lonergan

Abstract

Pseudoplectania sphagnophila (Pers.) Kreisel is added to the Irish mycoflora based on two recent collections from West Donegal and Offaly. A brief description of the Irish specimens is presented together with observations on the ecology of *P. sphagnophila*.

Introduction

Pseudoplectania Fuckel is an ascomycete genus with two species, *Pseudoplectania nigrella* (Pers.) Fuckel and *P. sphagnophila* (Pers.) Kreisel, known from Europe and North America. The genus is assigned to the family Sarcosomataceae in the order Pezizales (Hawksworth *et al.*, 1983) and two species, have been reported from Britain (Cannon *et al.*, 1985). Colour photographs of fresh material and descriptions have been published recently (Breitenbach and Kränslin, 1984; Ellis and Ellis, 1988). Consequently these taxa, albeit rare, are well known to British and continental European mycologists. In the Irish literature, *Sarcoscypha coccinea* (Fr.) Lambotte, a common species, is the only member of the Sarcosomataceae reported (Muskett and Malone, 1983). While both *Pseudoplectania* taxa could be anticipated to occur in Ireland, we are unaware of any previous Irish records.

Materials and Methods

Light microscopy observations were made on hand cut sections of fresh apothecia, mounted in water. Observations and measurements were made using an Olympus K microscope fitted with an eyepiece

graticule.
SPECIMENS EXAMINED: Ireland: V.C.H18, Offaly: Birr, Ridge Bog, alt: c.60m, Ir. grid ref. N048085, on peat, 10 March 1991, Fox 4378 (*herb.* H. Fox, *herb.* J. Feehan); V.C.H35, West Donegal: Glenveagh National Park, Owenbeagh Bog, alt: 45m, Ir. grid ref. C000188, on *Sphagnum capillifolium* (Ehrh.) Hedw., 28 March 1990, Fox 3117 and Lonergan (TCD).

Results

Pseudoplectania sphagnophila (Pers.) Kreisel
Apothecia: 8-15mm diam., solitary to gregarious, dull black, cup-shaped and shortly stalked. Excipulum hairs flexuose and sinuous, brown, septate, thin walled, 6-10µ wide to 200µ long. Asci: 8-spored, operculate, walls J-, at least 150µ by 13µ (intact asci bases not seen). Ascospores: simple, uniseriately arranged, 8-11.5µ diam., round, smooth, hyaline, 1-guttulate. Paraphyses: filiform, 1-2µ wide, tips usually straight, not swollen, sometimes slightly bent, brown pigmented in upper part (septae or forks not observed). Ecology: growing on cutover peat, fruiting in March. Description based on Fox 4378.

The Birr material is extensive with at least fifteen apothecia found in a small area. It was associated with cutover peat and *Erica* and *Calluna* litter. The specimen is in good accord with available descriptions of *Pseudoplectania sphagnophila* (Pers.) Kreisel (Breitenbach and Kränzlin, 1984; Ellis and Ellis, 1988). However some minor discrepancies should be noted. The spores are slightly smaller and the collection is associated with cutover bog. A replicate in *herb.* Feehan has been photographed and will be published in a forthcoming book on Irish boglands (Feehan and O'Donovan, in prep.).

The Glenveagh gathering, comprising a single apothecium, was

found growing with *Sphagnum capillifolium*. We detected it while recording the vegetation in a randomly placed quadrat on Owenbeagh Bog, on the 1990 Trinity College Botany School excursion to Donegal. The vegetation relve is presented in Table 1. Examination of surrounding hummocks by several participants failed to reveal further apothecia. The collection shows the typical ecology and the microscopic characters are in accord with published descriptions (Breitenbach and Kränzlin, 1984).

Discussion

We refrained from reporting *Pseudoplectania sphagnophila* as new to Ireland in 1990 as we had seen only a single apothecium. As the Birr collection is more extensive, a brief description has been prepared. In view of the slightly atypical ecology of the latter collection, the possibility foremost in our minds was it could belong to the closely allied taxon, *P. nigrella*. However, excluding differences in ecology, *P. nigrella* is primarily separated from *P. sphagnophila* by the presence of a glossy hymenium, a more sessile ascoma and slightly smaller ascospores inspersed with numerous minute guttules.

While *Pseudoplectania* is perhaps familiar to some peatland ecologists, as the black discomycete on bogs in the springtime, gatherings are required. HF would be pleased to examine any Irish collections of *Pseudoplectania* as well as other bryophilous ascomycetes.

Acknowledgements

We would like to thank Professor David Richardson, Dr Daniel Kelly and Dr Ciaran O'Keefe for organising the trip to Glenveagh. HF is much obliged to Dr John Feehan for his invitation to visit Ridge Bog and hospitality in Birr.

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TABLE 1. Vegetation associated with *Pseudoplectania sphagnophila* on Owenbeagh Bog, Glenveagh National Park, Co. Donegal (1 metre square quadrat using the domin scale of cover/abundance).

ascomycetes	
Pseudoplectania sphagnophila (Pers.) Kreisel	+
phanerograms	
Calluna vulgaris (L.) Hull	1
Erica tetralix L.	+
Myrica gale L.	+
Polygale serpyllifolia J. A. C. Hose	+
Schoenus nigricans L.	5
bryophytes	
Sphagnum capillifolium (Ehrh.) Hedw.	2
S. magellanicum Brid.	+
S. papillosum Lindb.	2
S. tenellum (Brid.) Brid.	+
Rhacomitrium languinosum (Hedw.) Brid.	1
Odontoschisma sphagni (Dicks.) Dum.	+
Pleurozia purpurea Lindb.	+
algae	
Zygogonium ericetorum auct. s. lat.	2

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NOTES ON THE DISTRIBUTION OF *ANDRICUS KOLLARI* (HARTIG) (HYMENOPTERA: CYNIPIDAE) IN IRELAND

J. P. O'Connor, M. A. O'Connor, S. Wistow and P. Ashe

Abstract

Research on the distribution of the cynipid *Andricus kollari* (Hartig) has shown the species to be widely distributed in Ireland.

The asexual or agamic generation of the cynipid *Andricus kollari* (Hartig) causes large spherical growths (up to 20mm) on oak (*Quercus*). These are popularly known as marble galls and they were first introduced into the British Isles in the 1830s for their tannin content. Brought originally into Devon, England, the species had spread as far as northern Scotland by 1860 (Redfern and Askew, 1992). *A. kollari* also probably colonised Ireland during this period but to-date, the authors have only traced one previous Irish record of this cynipid in the scientific literature. An infestation of adults occurred in a health centre in Tallaght, Co. Dublin (O02) on 30 August 1983. They had emerged from marble galls brought into the centre and stored on a shelf (O'Connor *et al.*, 1990). During a study of the Irish distribution of the cola-nut causer *Andricus lignicola* (Hartig) (O'Connor *et al.*, in press), the authors also collected the marble galls of *A. kollari* in many localities. These records are presented here. The Irish grid references are included, followed by the Universal Transverse Mercator (UTM) 50km grid references. The method used to obtain the UTM grid reference is described in Rasmont *et al.* (1986). The galls were stored in plastic bags indoors and the dates of emergence of the adults are noted here. The galls and adults were identified using Eady and Quinlan (1963) and Quinlan (1974). Data on the inquilines which emerged will be reported

elsewhere. The following abbreviations are employed in the text:- PA - P. Ashe, JMOC - J. P. O'Connor and M. A. O'Connor, JPOC - J. P. O'Connor and SW - S. Wistow.

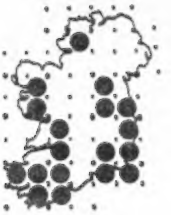
Distribution of *Andricus kollari* (Hartig) in Ireland

The distribution is summarised on the UTM grid (Figure 1). CARLOW: Altamont Gardens (S8665) (PU.4), 19.iv.1992, JPOC, in riverside woods; Bahana Woods, near St. Mullins (S7239) (PU.2), 24.iv.1992, JPOC, several galls on a mature tree; CAVAN: Virginia Woods (N5987) (PV.1), 8.x.1992, emerged 17.iii.1993, PA, JPOC and SW, 11.ii.1993, emerged 28-29.vi.1993, JPOC. Galls scarce but widespread; CORK: Carrigaline (W7462) (NT.2), 24.vi.1993, PA and SW; Glengarriff (V9256) (MT.4), 24.vi.1993, JPOC. Three galls were found on an isolated tree in the village but none were found in Glengarriff woods despite an intensive search; Little Island (W7772) (NT.1), 24.vi.1993, PA and SW; DONEGAL: south end of Lough Eske (G9581) (NA.3), 20.vii.1993, PA; DUBLIN: Killiney Hill (O2625) (PV.4) collected on various dates in 1992 , emerged 18.v.1992, 24.v.1992, 31.v.1992, 1.vii.1992, 9-10.vii.1992, 16.viii.1992, 2.ix.1992, 6.i.1993 and 9.ii.1993, SW, galls plentiful on some trees; National Botanic Gardens, Glasnevin (O1537) (PV.4), 25.x.1992, SW; Mount Anvil (O1828) (PV.4), 17.xi.1992, SW; Phoenix Park (O1036, O1035, O1136) (PV.4), 26.iv.1992, emerged December 1992 and January 1993, JMOC, galls widespread and often plentiful; Tallaght (O02) (PV.4), adults 30.viii.1983, O'Connor *et al.*, 1990; KERRY: near Anascaul, Dingle Peninsula (Q5601) (MT.1), 17.vi.1993, JPOC, galls scarce and on only two trees; Barry's Glen, near Killarney (V9597) (MT.3), 20.vi.1993, JPOC, scarce on trees in roadside hedgerows and on a hill; Blue Pool, Cloghereen, Killarney National Park (V9886) (MT.3), 18.vi.1993, JMOC, often abundant; Doo Lough, Killarney National Park (V9586) (MT.3), 16.vi.1993, JPOC, plentiful in surrounding woods; near Fieries (Q8903) (MT.3), 19.vi.1993, JMOC, abundant on hedgerow trees; Hotel Europe,

Killarney (V9191) (MT.3), 22.vi.1993, emerged 26.viii.1993 and 30 August 1993, JPOC, common and widespread in the adjoining woods on the Lower Lake; Knockreer House, Killarney National Park (V9591) (MT.3), 14.vi.1993, JPOC, widespread and often abundant; Lady's View, Killarney National Park (V9080) (MT.3), 15.iv.1993, JPOC, widespread and sometimes abundant; Mangerton Road, Killarney (V9886) (MT.3), 21.vi.1993, JPOC, frequent in nearby woods; Muckross Estate, Killarney National Park (V9786) (MT.3), 14.iv.1993, 15.vi.1993, emerged 30 August 1993, JPOC, widespread and often abundant; Ross Island, Killarney National Park (V9488) (MT.3), 14.iv.1993, JPOC, sometimes plentiful; KILDARE: Donadea Forest Park (N8332) (PV.2), 4.ii.1993, emerged 22.vii.1993, JPOC, widespread and sometimes abundant; Moyvalley N7242) (PV.2), 26.iii.1993, emerged 22.vii.1993, PA, JMOC and SW, scarce on a canalbank tree; KILKENNY: Airport Road near Kilkenny City (S4756) (PU.2), 19.xi.1992, SW, in limestone quarry; LIMERICK: Adare Manor (R4645) (NU.2), 13.iv.1993, JPOC, plentiful on three trees in park land; near Castleconnell (R6662) (NU.2), 1.iv.1993, PA and SW; MAYO: Erriff Woods (L9668) (MV.4), 26.iii.1993, PA, JMOC and SW, very rare; Westport House (L9984) (MV.3), 26.iii.1993, PA, JMOC and SW, scarce in the estate grounds; MEATH: Swainstown (N9057) (PV.4), 28.vi.1992, emerged 5.vii.1992, JPOC, on hedgerow trees; TIPPERARY: Ballina (R7072) (NU.1), 17.iv.1993, JPOC, on one riverside tree; WATERFORD: Old Court Hotel (S5410) (PT.1), 22.iv.1992, JPOC, plentiful on some trees; WESTMEATH: Belvidere Estate (N4247) (PV.2), 25.ii.1993, emerged 13.vii.1993, JPOC, abundant on some trees; WEXFORD: Coolbawn House (S8237) (PU.2), 18.iv.1992, emerged 10.vii.1992 and 15-16.viii.1992, JMOC, common on some trees; Johnstown Castle (T0216) (PT.3), 19.viii.1993, JPOC, widespread and sometimes plentiful; J. F. Kennedy Park (S7319) (PT.1), 20.viii.1993, JPOC, plentiful on some trees; National Heritage Park, Ferrycarrig (T0023) (PU.4), 20.viii.1993, JMOC, common on some trees; New Ross (S7228) (PU.2), 20.iv.1992, JPOC, on roadside trees; WICKLOW: Avondale (T1986) (PU.3),

1.xi.1992, SW; Broad Lough (T3096) (PU.3), 9.xii.1992, SW; Castlekevin (T1797) (PU.3), 17.xii.1992, emerged 2.iv.1993, SW; Glendalough (T1196) (PU.3), 2.vii.1992, emerged 4.vii.1992, JPOC, widespread and often abundant; Glenart Castle (T2074) (PU.3), 21.i.1993, emerged 2.iv.1993, SW; Glending (N9615) (PU.3), 26.x.1992, 17.xii.1992, emerged 18.i.1993, JMOC and SW; Glenmalure (T0694) (PU.3), 5.xi.1992, SW; Killiskey (O2600) (PU.3), 6.ii.1993, SW; Kilruddery Estate, near Bray (O2616) (PU.3), 23.vi.1993, PA and SW; Knocksink Wood (O2217) (PU.3), 15.iv.1993, SW; Lough Tay (O1606) (PU.3), 29.x.1992, PA and SW; OldBridge, Roundwood (O1601) (PU.3), 7.i.1993, SW; Powerscourt Waterfall (O2012) (PU.3), 15.ii.1993, 6.v.1993, JPOC, widespread and often abundant.

FIGURE 1: The distribution of *Andricus kollari* (Hartig) in Ireland



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A CHECKLIST FLORA OF NORTH TIPPERARY, IRELAND

David W. Nash

Introduction

The earliest known botanical work in Tipperary was carried out by Richard Heaton who lived for a time at Ballyskenagh, now Mount St. Joseph, near Roscrea. Heaton has been described as Ireland's first botanist. How published his *Phytologia Britannica* in 1650 and in it he refers to Heaton's discovery of wintergreen "In a Bogge by Roscre in the King's County". Whether this discovery was in Offaly or in Tipperary is not entirely clear. However Phillips' discovery of Common Wintergreen (*Pyrola minor*) at Mount Butler in 1919, gives some support to the view that Heaton's report may refer to Tipperary. The next significant contributors include Mackay and Moore.

During the last quarter of the 19th and the earlier part of the 20th century a number of botanists made considerable additions to the known flora of North Tipperary. Hart made excursions along the river valleys and mountains and to Lough Derg. Lough Derg was also visited by Colgan and Lilly. It was Lilly who first reported the occurrence of the Irish Fleabane (*Inula salicina*) in Tipperary. This species, in the British Isles, has been found only on the shores of Lough Derg. Phillips added a very substantial number to the species list, and some of his findings were incorporated by Praeger in his compilation of the *Irish Topographical Botany* (1901). Praeger visited Tipperary on several occasions and some of his original notes are found in the "London Catalogues" used in the preparation of I.T.B., now in the Herbarium in the National Botanic Gardens, Glasnevin.

Subsequent work was done by Webb and others and included in the

Atlas of the British Flora (Perring and Walters, 1962). Richard McMullen commenced extensive and systematic recording of the flora of the vice-county in 1965. He accumulated substantial records over a period of a decade. The present checklist draws very heavily on McMullen's unpublished records and has been supplemented by the BSBI 1987/88 Survey, led by G. Sharkey, and by more recent fieldwork done by the author and others. The *Census Catalogue of the Flora of Ireland* (Scannell and Synnnott, 1972, 1987) contains a list of plants together with their English and Irish names and a list for each of the vice-counties.

It is emphasised that this checklist is not intended to be a comprehensive account of the flora of North Tipperary, but should be considered as a foundation for further investigations. Extensive and intensive searchs of herbaria should yield further information. It is hoped this publication will encourage others to send details of their findings to the author or to publish additions to the list.

The vice county boundaries

The Irish biological vice-county boundaries were defined by Praeger (1901). Tipperary is divided into two vice-counties - H10 in the north and H7 in the south. The vice-county boundary differs significantly from that of the current administrative one between the North and South Tipperary Ridings, because Praeger used the Great Southern Railway line from Portlaoise through Limerick Junction as the boundary. This division has, in the field, the great merit of being well defined. The western part of the boundary of the vice-county runs through the centre of Lough Derg, as is shown on the map (Figure 1).

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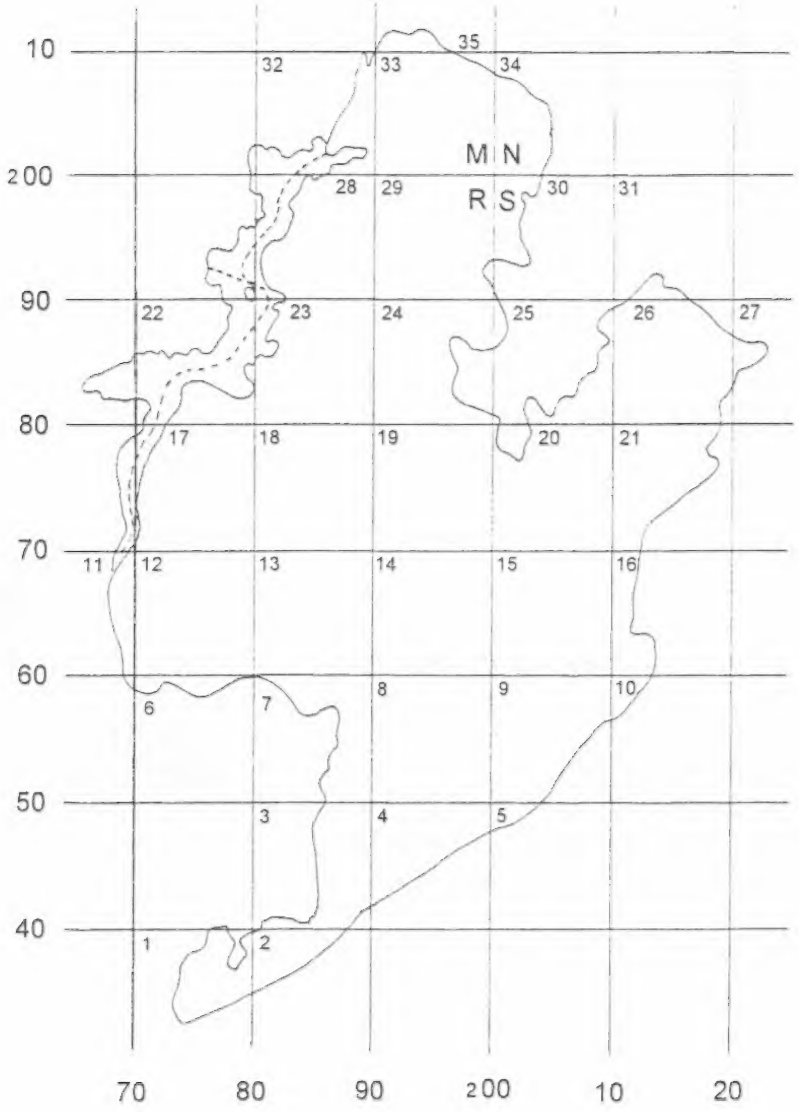
Figure 1: North Tipperary, with National Grid and square numbers.



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The checklist

The 10km squares of the National Grid have been used as the recording unit for the checklist. Each square has been assigned a number (between 1 and 35) as shown on the vice-county map (Figure 1). In the text, published records for species (both pre- and post-1965) are given and the squares where a species has been recorded since 1965 are indicated. Other records derive from herbarium specimens, from field cards and private communications from botanists who have worked in the vice-county. A list of topographical references is given (Appendix 1).

Contributors to the checklist

The known contributors to the checklist are listed below:

J. R. Akeroyd, D. E. Allen, Croker Barrington, F. H. Bennis, E.Booth, J. J. Breen, A. A. Butcher, N. C. Colgan, L. Curran, P. Darcy, D. A. Doogue, E. Doogue, M. Dowd, D. J. Dunne, A. Farragher, Rosaleen Fitzgerald, Rosemary FitzGerald, S. Geraghty, R. N. Goodwillie, V. Gordon, Mrs. Gough, P. Grant, S. Grubb, W. F. Gunn, P. Harrold, A. Hart, H. C. Hart, Prof. Harvey, R. Heaton, S. Heery, J. Hillgarth, D. D. Hobson, J. Hodgens, P. Hodson, Miss Jackson, Adl. Jones, A. Keane, D. L. Kelly, J. Keogh, G. H. Kinahan, J. J. King, N. Lockhart, D. McClintock, J. T. Mackay, R. M. McMullen, S. Madden, D. Moore, J. M. Moore, A. Newton, M. Norton, R. D. O'Brien, A. O'Sullivan, R. J. Pankhurst, F. H. Perring, R. A. Phillips, R. Ll. Praeger, S. C. P. Reynolds, M. J. P. Scannell, J. Shackleton, G. Sharkey, M. Sheehy Skeffington, D. M. Synnott, N. Tirard, R. B. Vowell, W. Wade, T. Walford, D. A. Webb, S. D. Webster.

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Nomenclature

The nomenclature for vascular plants essentially follows that of Kent (1992) and Stace (1992), and the "common names" follow Stace (*op. cit.*). Charophyte names follow *British Stoneworts* (Allen, 1950). The nomenclature for vascular plants differs from that of the *Census Catalogue of the Flora of Ireland* (Scannell and Synnott, 1987) in respect of a number of species and so a short list of synonyms is given (Appendix 2).

References, abbreviations and herbaria

Published records are given in the text. "Near Waterloo Lodge (McMullen - Nash 1991)", indicates that the recorder was McMullen and that the record was published in 1991 by Nash. Square brackets [ ] signify that the record is unpublished.

ITB	*Irish Topographical Botany*.
CybI	*Cybele Hibernica*, 1st Edition.
CybII	*Cybele Hibernica*, 2nd Edition.
OP3 and OP5	*Occasional Papers of the National Botanic Gardens*
Atlas	*Atlas of the British Flora*.
N, S, E, W	Points of the compass.
subsp.	Subspecies
BM	British Museum Herbarium, London.
CGE	University Herbarium, Cambridge.
DBN	National Herbarium, Dublin.
TCD	University Herbarium, Trinity College, Dublin.

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CHARACEAE

Chara aculeolata (Stonewort)

West of Thurles (Groves, DBN - Praeger, 1902); Maudemount bog, Annacarty (Nash and Fitzgerald, 1992). 4, 23, 32.

Chara aspera

Dromineer (Colgan, 1897); Roscrea and Carrigahorig (Phillips - Praeger, 1902). 29.

Chara contraria

Dromineer, Lough Derg (Praeger, 1902). 17, 23, 32.

Chara delicatula

Pool beside Shannon below Ballina; above weir north of O'Briensbridge (Nash, 1993). 3, 4, 11, 17, 22, 35.

Chara desmacantha

Youghal Bay, Lough Derg (Groves, BM, 1899); Slevoir Bay (Moore, BM, 1975). 32.

Chara globularis

Friar's Lough, Portumna (Groves, DBN - Praeger, 1898); Templemore Lake (Moore, BM). 4, 21.

Chara hispida

West of Thurles; Youghal Bay (Praeger, 1902). 28.

Chara rudis Ballingarry; Cloughjordan; Youghal Bay (Praeger, 1902). 21.

Chara tomentosa

Praeger, 1902; Slevoir Bay (Moore, BM, 1975). 32.

Chara vulgaris

West of Thurles (Groves, DBN - Praeger, 1902). 2-3, 17, 21-22, 26, 35.

Nitella opaca/flexilis

13, 20, 35.

Tolypella glomerata

Slevoir Point, Lough Derg (Colgan, 1897).

LYCOPODIACEAE

Huperzia selago (Fir Clubmoss)

Praeger, 1901. 26.
Lycopodium clavatum (Stag's-horn Clubmoss)
Kilduff mountain at 1400' (Hart, 1885a); Saddle of Silvermines (McMullen - Nash, 1993). 13.

SELAGINELLACEAE
Selaginella selaginoides (Lesser Clubmoss)
Dromineer (Phillips); frequent in north-west (Praeger, 1901). 19, 22-24, 28-30, 32, 34.

EQUISETACEAE
Equisetum hyemale (Rough Horsetail)
With *Schoenus nigricans* on northern shore of Lough Nahinch (McMullen, 1972). 19, 29.
Equisetum variegatum (Variegated Horsetail)
Maudemount bog, Annacarty (Nash and Fitzgerald, 1992); Marsh west of Bunrevan House (McMullen, 1968, 1972). 4, 16, 32, 34.
Equisetum fluviatile (Water Horsetail)
Praeger, 1901. 2-5, 7-9, 11, 13-16, 18-24, 26-35.
Equisetum x *litorale* (Shore Horsetail)
On Friar's Island below Portumna; Shannon below Killaloe (Praeger, 1929b). 28, 32-33.
Equisetum arvense (Field Horsetail)
1-5, 7-35.
Equisetum sylvaticum (Wood Horsetail)
Along Lower Brosna tributary north of Templemore (Hart, 1885a). 3, 8, 12-13, 15, 19-20, 26.
Equisetum palustre (Marsh Horsetail)
3, 5, 9, 12-15, 17-24, 26, 28-35.
Equisetum telmateia (Great Horsetail)
Roadside between Newport and Glenstal; along Lower Brosna tributary north of Templemore and Killough bridge (Hart, 1881, 1885a). 3, 4, 7-8, 12-13, 15, 19-21, 26.

OPHIOGLOSSACEAE

Ophioglossum vulgatum (Adder's-tongue)
In moist meadows (Walford, 1818); Devil's Bit at 1050' (Hart, 1885a); Dromineer; widespread and frequent (ITB). 9, 23-24, 27-28.
Botrychium lunaria (Moonwort)
Keeper range (Foot - Kinahan, 1860a, 1860b, 1863).

OSMUNDACEAE

Osmunda regalis (Royal Fern)
Lalor's bog, Annagh; Bretin bog (Kinahan - Synnott, 1968). 6, 9, 11, 21, 24, 26, 28-35.

HYMENOPHYLLACEAE

Hymenophyllum tunbrigense (Tunbridge Filmy-fern)
Keeper range (Kinahan, 1860a, 1860b, 1863); occurs in Tipperary (CybII).
Trichomanes speciosum (Killarney Fern)
Tipperary near Glenstal (Barrington - Hart, 1881); Refound by Br A. Keane (DBN, 1970). 6.

POLYPODIACEAE

Polypodium vulgare agg.
Luxuriant on Scilly Isles (Colgan, 1897); Annagh, at Traduff bog (Kinahan - Synnott, 1968). 1-2, 4-7, 9-10, 12-15, 17-23, 26, 28-29, 32-33.
Polypodium vulgare (Polypody)
On *Quercus robur* at Bellevue House (McMullen, 1972). 1-4, 6-7, 12-13, 15-23, 26, 28-29, 32-33.
Polypodium interjectum (Intermediate Polypody)
On walls in Roscrea (McMullen, 1972). 10, 13, 14, 17-23, 26, 28, 31, 33, 34.
Polypodium cambricum (Southern Polypody)
On wall at Borriscokane (McMullen, 1972). 15, 28-29.

DENNSTAEDTIACEAE
Pteridium aquilinum (Bracken)
1, 3-21, 23-26, 29-33, 35.

THELYPTERIDACEAE
Oreopteris limbosperma (Lemon-scented Fern)
South side of Keeper (Hart, 1881); Devil's Bit and Knockanora (Praeger, 1899).

ASPLENIACEAE
Phyllitis scolopendrium (Hart's-tongue)
Annagh; Newport common (Kinahan - Synnott, 1968). 1-9, 11, 13-34.
Asplenium adiantum-nigrum (Black Spleenwort)
4, 6, 12-13, 15, 17, 19-26, 28-29, 33.
Asplenium onopteris (Irish Spleenwort)
Near Cloughjordan (Praeger, DBN, OP3, OP5).
Asplenium trichomanes subsp. *quadrivalens* (Maidenhair Spleenwort)
Newport, Annagh (Kinahan - Synnott, 1968). 1-10, 13-26, 28-34.
Asplenium ruta-muraria (Wall-rue)
Newport; Annagh (Kinahan - Synnott, 1968). 1-7, 9-10, 12-13, 15-34.
Ceterach officinarum (Rustyback)
Annagh by Lough Derg (Kinahan - Synnott, 1968). 1-7, 9-10, 13, 15, 17-24, 26, 29-30, 32-34.

WOODSIACEAE
Athyrium filix-femina (Lady-fern)
3-4, 6, 8-9, 12-15, 17-23, 26-27, 29-31, 34.
Cystopteris fragilis (Brittle Bladder-fern)
Keeper, Ballyhourigan wood (Hart, 1881).

DRYOPTERIDACEAE
Polystichum setiferum (Soft Shield-fern)
Eastern slope of Benduff (Hart, 1885a); Newport; Keeper (Kinahan -

Synnott, 1968). 1-9, 11, 14-26, 28, 30, 33.
Polystichum aculeatum (Hard Shield-fern)
Keeper Range (Kinahan, 1860a, 1860b, 1863); Dromineer (Praeger, 1901). 4, 14-15, 17, 19, 22, 24, 26.
Dryopteris filix-mas (Male-fern)
Keeper mountain (Kinahan - Synnott, 1968). 1-5, 7-9, 11-35.
Dryopteris affinis (Scaly Male-fern)
3-5, 8-9, 11-12, 14-15, 17, 19, 22, 25, 27-29, 32, 33.
Dryopteris aemula (Hay-scented Buckler-fern)
Keeper (Kinahan, 1860a, 1860b, 1863); Bushfield (ITB). 1, 6, 13, 18.
Dryopteris carthusiana (Narrow Buckler-fern)
Barracurra; Friar's Lough (ITB); Annagh Inch (Kinahan, 1855, 1860a, 1860b). 4, 8-9, 21, 24, 26, 34, 35.
Dryopteris dilatata (Broad Buckler-fern)
Keeper summit (Hart, 1881); Keeper and Kreny(?) hills; Annagh (Kinahan - Synnott, 1968). 1, 3-5, 79, 11-35.

BLECHNACEAE
Blechnum spicant (Hard-fern)
Walshpark woods; Annagh bog; Keeper (Kinahan - Synnott, 1968). 3-4, 6-9, 11-15, 17-22, 24-27, 29-31, 34-35.

PINACEAE
Pinus sylvestris (Scots Pine)
3-5, 7, 9, 15, 19-25, 29-33, 35.

CUPRESSACEAE
Juniperus communis subsp. *communis* (Common Juniper)
Frequent on shores and islands of Lough Derg (Hart, 1881; Colgan, 1897). 22-23, 28, 32.

TAXACEAE

Taxus baccata (Yew)

Yew wood near Gortmore (McMullen). 18-19, 24, 26, 28-30, 32-34.

NYMPHAEACEAE

Nymphaea alba (White Water-lily)

9, 14, 19, 22-23, 26, 28-29, 32.

Nuphar lutea (Yellow Water-lily)

Frequent along Lough Derg (Colgan 1897). 11, 14-15, 17, 22-23, 28-29, 32-35.

RANUNCULACEAE

Caltha palustris (Marsh-marigold)

North eastern shores of Lough Derg (Praeger, 1934). 2-4, 6-9, 11-35.

Anemone nemorosa (Wood Anemone)

6, 14, 20, 23, 26, 28, 31-34.

Clematis vitalba (Traveller's-joy)

Near Dromineer (Phillips); Ballina (ITB). 14, 18-19, 22-24, 26-29, 31-32, 34.

Ranunculus acris (Meadow Buttercup)

1-35.

Ranunculus repens (Creeping Buttercup)

1-35.

Ranunculus bulbosus (Bulbous Buttercup)

7, 16, 19-20, 22-27, 31, 33-34.

Ranunculus auricomus (Goldilocks Buttercup)

Praeger, 1906. 14, 24, 32, 34.

Ranunculus sceleratus (Celery-leaved Buttercup)

2-4, 28, 32-33.

Ranunculus lingua (Greater Spearwort)

North west of Nenagh; Portumna (ITB). 18, 23-24, 28, 32.

Ranunculus flammula (Lesser Spearwort)

1, 3-5, 7-9, 12-35.

Ranunculus ficaria (Lesser Celandine)
5, 11, 14, 19, 22-26, 28, 30-35.
Ranunculus hederaceus (Ivy-leaved Crowfoot)
4, 8-9, 13-14, 17-22, 29, 34.
Ranunculus trichophyllus (Thread-leaved Water-crowfoot)
Roscrea (Phillips); Lough Ourna; Portumna (ITB). 2, 4, 15, 16, 18-21, 23-25, 28-29.
Ranunculus aquatilis (Common Water-crowfoot)
Lough Ourna, 1899 (ITB). 16, 29.
Ranunculus peltatus (Pond Water-crowfoot)
Shannon above Portumna (ITB). 7, 19, 29, 34.
Ranunculus penicillatus (Stream Water-crowfoot)
Roscrea and Templemore; Nenagh (ITB). 5-6, 8-9, 13, 15, 18-20, 22, 24, 26, 28-29, 31, 34.
Ranunculus circinatus (Fan-leaved Water-crowfoot)
Borrisokane (Phillips); Youghal bay (ITB). 17, 22-23.
Aquilegia vulgaris (Columbine)
Frequent throughout (Lilly, 1896); Bog at Carrigahorig and at Dromineer (Phillips - ITB). 5, 23-24, 28.
Thalictrum flavum (Common Meadow-rue)
Borrisokane (Lilly, 1896); Carrigahorig; Portumna (ITB). 9, 17, 23, 28-29, 32, 34-35.
Thalictum minus (Lesser Meadow-rue)
Dromineer (Phillips); frequent on Lough Derg (ITB). 32.

BERBERIDACEAE
Berberis vulgaris (Barberry)
Shore of Lough Derg, north of Luska (McMullen, 1972). 23.

PAPAVERACEAE
Papaver somniferum (Opium Poppy)
Wasteground at Borrisokane (McMullen, 1972). 9-10, 18, 29.
Papaver rhoeas (Common Poppy)
2, 4, 9-10, 15-16, 18-21, 23-26, 28-34.

Papaver dubium (Long-headed Poppy)
Phillips - Praeger, 1934a. 4, 9-11, 15, 18-20, 23-24, 26, 28-30, 32, 34.
Papaver lecoqii (Yellow-juiced Poppy)
Roadside east of Toomevara (McMullen, 1972, OP3). 3-4, 9, 18-19, 22-24, 26, 29, 34.
Papaver argemone (Prickly Poppy)
Atlas, OP3.
Chelidonium majus (Greater Celandine)
26, 34.

FUMARIACEAE
Ceratocapnos claviculata (Climbing Corydalis)
South eastern face of Devil's Bit; Lackamore east-south-east of Newport (McMullen, 1972). 12, 20.
Fumaria capreolata subsp. *babingtonii* (White Ramping-fumitory)
19.
Fumaria bastardii (Tall Ramping-fumitory)
15, 18-20, 22-24, 26, 29, 33-34.
Fumaria muralis subsp. *boraei* (Common Ramping-fumitory)
19-20, 23, 26, 29, 31, 33.
Fumaria purpurea (Purple Ramping-fumitory)
Maudemount bog (Nash, 1993). 4.
Fumaria officinalis (Common Fumitory)
3-4, 9-10, 15, 18-20, 22-24, 26, 29, 31, 34-35.

ULMACEAE
Ulmus glabra (Wych Elm)
1-5, 9, 11, 14-15, 18-24, 26-27, 29-34.
Ulmus procera (English Elm)
1, 8-10, 13-15, 18-24, 26-32, 34-35.
Ulmus minor (Small-leaved Elm)
fide Kelly (OP3). 33.

CANNABACEAE

Humulus lupulus (Hop)

Near Birr (Wade, 1804); Nenagh (Mackay, 1806); Brosna tributary; Killough bridge (Hart, 1885a).

URTICACEAE

Urtica dioica (Common Nettle)

1-5, 7-35.

Urtica urens (Small Nettle)

15, 19, 22-24, 26-28, 33-35.

Parietaria judaica (Pellitory-of-the-wall)

"Only one station" (ITB). 18, 22-24, 26, 29, 34.

MYRICACEAE

Myrica gale (Bog-myrtle)

19, 21, 23-25, 28-30, 32-35.

FAGACEAE

Fagus sylvatica (Beech)

1-7, 9, 11-35.

Castanea sativa (Sweet Chestnut)

Perring, 1962, OP3. 19.

Quercus petraea (Sessile Oak)

3, 6, 8-9, 12, 15, 18-21, 23-24, 26-34.

Quercus petraea x *Q. robur*

Clare Glens (Kelly, TCD, OP3). 26.

Quercus robur (Pedunculate Oak)

3-7, 9, 11-13, 15-16, 18-21, 23-34.

BETULACEAE

Betula pendula (Silver Birch)

Dromineer (Phillips); frequent at Lough Derg (ITB). 6, 8-9, 12, 15, 18-24, 26-27, 29-31, 35.

Betula pubescens (Downy Birch)

Redwood bog (Nash, 1992). 4, 6-9, 11-15, 17-35.
Alnus glutinosa (Alder)
3, 4-9, 11-13, 15, 17-35.
Corylus avellana (Hazel)
Redwood bog (Nash, 1992). 3-9, 12-35.

CHENOPODIACEAE
Chenopodium bonus-henricus (Good-King-Henry)
Praeger 1934a. 23.
Chenopodium rubrum (Red Goosefoot)
Farmyard at Pope's Bridge (Nash, 1993). 3.
Chenopodium album (Fat-hen)
2-13, 15-16, 18-35.
C. album f. *glomerulosum*
South west of Nenagh; two sites in Roscrea (Reynolds, 1992). 18, 26.
Atriplex prostrata (Spear-leaved Orache)
Edge of field on Monaincha bog road (McMullen, 1972; OP3) 15, 19, 26, 33.
Atriplex patula (Common Orache)
1-2, 4, 8, 10, 12-13, 18-24, 26-35.

AMARANTHACEAE
Amaranthus retroflexus (Common Amaranth)
North east of Birdhill - Doogue; Roscrea; near Monard - Tirard (Reynolds, 1992). 2, 12, 26.

PORTULACACEAE
Montia fontana (Blinks)
4, 8, 12, 14-15, 19-20, 24.
Montia fontana subsp. *amporitana*
[Beside pond near Annacarty, 1992]. 4.

CARYOPHYLLACEAE

Arenaria serpyllifolia subsp. *serpyllifolia* (Thyme-leaved Sandwort)
5, 9-10, 13, 15-16, 18-20, 22-26, 28-29, 32, 34-35.

Arenaria leptoclados subsp. *leptocladius* (Slender Sandwort)
Nenagh (Phillips); Ballingarry (Praeger, 1902). 2, 13, 17-19, 34.

Moehringia trinervia (Three-nerved Sandwort)
At Gortmore (Colgan, 1897); Silvermines (ITB). 6, 18-24, 26, 30.

Minuartia hybrida (Fine-leaved Sandwort)
Roscrea (Phillips); Cloughjordan; Portumna (ITB). DBN.

Stellaria media (Common Chickweed)
1-24, 26-35.

Stellaria holostea (Greater Stitchwort)
2, 5, 6-9, 12-22, 24-28, 30-31, 33, 35.

Stellaria palustris (Marsh Stitchwort)
12, 32, 34-35.

Stellaria graminea (Lesser Stitchwort)
1-9, 11-24, 26-35.

Stellaria uliginosa (Bog Stitchwort)
1-2, 4, 6-9, 12-15, 17-27, 31-33, 35.

Cerastium fontanum subsp. *vulgare* (Common Mouse-ear)
Keeper at 2000' (Hart, 1881). 1-5, 7-35.

Cerastium glomeratum (Sticky Mouse-ear)
Roadside between Keeper and Newport (Hart, 1881). 2, 4, 8-10, 13, 15-16, 18-26, 29, 31, 33-34.

Cerastium diffusum (Sea Mouse-ear)
Portumna (ITB). 10.

Sagina nodosa (Knotted Pearlwort)
9, 15-17, 20-24, 26, 28-29, 31-35.

Sagina procumbens (Procumbent Pearlwort)
1-4, 8-15, 17-35.

Sagina apetala (Annual Pearlwort)
Praeger, 1934a. 1-3, 5, 7, 10, 13, 15-22, 24, 26-28, 31-33.

Spergula arvensis (Corn Spurrey)

7-10, 15, 17-23, 27-28, 30, 33-34.
Lychnis flos-cuculi (Ragged-Robin)
1-9, 12-15, 18-20, 22-27, 30-34.
Agrostemma githago (Corncockle)
Near Nenagh (Phillips - ITB).
Silene vulgaris subsp. *vulgaris* (Bladder Campion)
Nenagh; Thurles (ITB). 23, 35.
Silene latifolia subsp. *alba* (White Campion)
Nenagh (ITB). 19-20, 28-29, 34-35.
Silene dioica (Red Campion)
Ballyhourigan wood (Doogue, OP3; OP5). 18-19, 28.
Saponaria officinalis (Soapwort)
1, 23, 32-33.

POLYGONACEAE
Persicaria wallichii (Himalayan Knotweed)
Roadsides between Nenagh and Birdhill ((Nash, 1993). 13-14, 23.
Polygonum amplexicaulis (Red Bistort)
Banks of Nenagh River, 1.5km east of Latteragh (McMullen, 1972).
9, 14, 19, 22, 32.
Persicaria amphibia (Amphibious Bistort)
4, 9, 11, 15, 18-24, 26-30, 32-35.
Persicaria maculosa (Redshank)
1-6, 8-15, 17-24, 26-35.
Persicaria lapathifolia (Pale Persicaria)
2, 4, 9, 19-22, 24, 26, 32-33.
Persicaria hydropiper (Water-pepper)
1, 4, 6, 8-9, 12-15, 17-22, 24, 26-27, 31-33, 35.
Polygonum arenastrum (Equal-leaved Knotgrass)
Near Currabaha Cross (McMullen, 1972; OP3). 1, 4, 9, 14-16, 19,
24, 32-33.
Polygonum aviculare (Knotgrass)
Praeger, 1934a. 1-25, 27-35.
Fallopia japonica (Japanese Knotweed)

Perring, 1963; OP3. 4, 7-8, 15, 17-18, 21-23, 26, 29.
Fallopia sachalinensis (Giant Knotweed)
Mulkear river bank beteen Keeper Hill and Silvermines (McMullen, 1972; OP3) 8, 12-13, 18, 26.
Fallopia convolvulus (Black-bindweed)
8, 15, 18-24, 26, 29, 31-35.
Rumex acetosella (Sheep's Sorrel)
3-6, 8-15, 17-22, 29-32, 34-35.
Rumex acetosa (Common Sorrel)
Summit of Keeper (Hart, 1881). 1-9, 11-35.
Rumex hydrolapathum (Water Dock)
Youghal Bay; Portumna (ITB). 17, 22-23, 27-28, 32, 35.
Rumex crispus (Curled Dock) 1-35.
Rumex crispus x *R. obtusifolius*
Latteragh and Killeen, BSBI survey (Grant, Hodson, Sharkey - Nash, 1993). 4, 19.
Rumex conglomeratus (Clustered Dock)
1-4, 6-7, 9, 13, 15, 17-24, 26-35.
Rumex sanguineus (Wood Dock)
2-4, 8-9, 14-15, 17-24, 26-35.
Rumex sanguineus x *R. obtusifolius*
At Lorrha (Sharkey - Nash, 1993). 33.
Rumex pulcher (Fiddle Dock)
One plant at Nenagh (Phillips - ITB).
Rumex obtusifolius (Broad-leaved Dock)
1-35.
Rumex maritimus (Golden Dock)
Eastern shore of Lough Ourna (McMullen, 1969, 1972; OP3). 23.

CLUSIACEAE
Hypericum androsaemum (Tutsan)
In Tipperary woods (Walford, 1818); along the Nore (Hart, 1885b).
4, 6, 8-9, 12, 14-15, 17-20, 22-24, 26, 28-34.
Hypericum perforatum (Perforate St. John's-wort)

1, 2, 4-6, 8-10, 15-16, 18-26, 28-34.
Hypericum maculatum (Imperforate St. John's-wort)
Cloughjordan; Portumna (ITB). 8, 16, 18-19, 21, 24, 35.
Hypericum tetrapterum (Square-stalked St. John's-wort)
1-7, 9-15, 17-24, 26-29, 31-35.
Hypericum humifusum (Trailing St. John's-wort)
Bushfield (ITB). 7-8, 13-15, 19-20, 26, 28.
Hypericum pulchrum (Slender St. John's-wort)
2-4, 7-10, 12-15, 17-24, 26-35.

TILIACEAE
Tilia platyphyllos x *T. cordata* (Lime)
18-19.

MALVACEAE
Malva moschata (Musk-mallow)
At Dromineer (Colgan, 1897); Roscrea (Phillips); Thurles (ITB).
18, 28.
Malva sylvestris (Common Mallow)
8-9, 12-13, 17-21, 23-24, 28-34.
Malva neglecta (Dwarf Mallow)
Cloughjordan (ITB). 33.
Lavatera arborea (Tree-mallow)
Beside castle at Dromineer (McMullen, 1972; OP3). 23, 32.

DROSERACEAE
Drosera rotundifolia (Round-leaved Sundew)
3, 7, 9, 11, 13-14, 21, 23-27, 29-35.
Drosera longifolia (Great Sundew)
Bog between Newport and Castleconnell [H8/10] (Mackay, 1825); near Portumna (Phillips - ITB); bog east-north-east of Castleconnell (Webb, 1945). 11, 21, 24, 26, 29, 33-34.
Drosera intermedia (Oblong-leaved Sundew)
Bog between Newport and Castleconnell [H8/10] (Mackay, 1806,

1825); Cloughjordan (ITB); bog east-north-east of Castleconnell (Webb, 1945). 21, 26, 29, 32, 35.

VIOLACEAE

Viola odorata (Sweet Violet)
Hedges near Dromineer (Colgan, 1897); Youghal Bay (ITB). 9-10, 24,26, 28-29, 31, 34.

Viola riviniana (Common Dog-violet)
4, 6-9, 12-35.

Viola reichenbachiana (Early Dog-violet)
Wood at Millpark Roscrea (Phillips, 1924a). 19, 30-31, 34.

Viola canina (Heath Dog-violet)
Youghal Bay; frequent on Lough Derg (ITB). 25.

Viola palustris (Marsh Violet)
ITB.

Viola arvensis (Field Pansy)
19-20, 23, 26, 28-30, 34.

SALICACEAE

Populus alba (White Poplar)
28, 32.

Populus tremula (Aspen)
Near Lorrha (Phillips, DBN; OP3; OP5). 4, 13-14, 18-19, 22-24, 28-30, 33-35.

Populus nigra (Black-poplar)
At Ballinderry (Hobson, 1991); Maudemount, Annacarty (Nash and Fitzgerald, 1992). 4, 17, 19, 23, 26, 34.

Populus nigra x *P. deltoides* (Hybrid Black-poplar)
Dromineer; Portumna; Cloughjordan (ITB). 2, 7, 9-10, 13-16, 18-19, 21, 24, 28-31, 34-35.

Salix pentandra (Bay Willow)
Frequent near Borrisokane; between Templemore and Thurles (Phillips, 1924a). 13, 16, 21, 24.

Salix fragilis (Crack-willow)

1-4, 6-7, 9, 11, 13, 15, 18-24, 26, 28-29, 32-35.

Salix alba (White Willow)

2-5, 8-9, 13, 15, 18, 21, 23-24, 26, 31-32, 34.

Salix triandra (Almond Willow)

Cloughjordan (ITB). 14.

Salix triandra x *S. viminalis* var. *undulata* (Sharp-stipuled Willow)

[West side of Knockteige, 1992]. 13.

Salix purpurea (Purple Willow)

Roscrea (Phillips); Cloughjordan; Lough Ourna (ITB). 4, 15, 18, 23, 26, 28-29, 32, 35.

Salix viminalis (Osier)

1-5, 7-10, 12-16, 18-22, 24-26, 28-29, 32, 34.

Salix viminalis x *S. caprea* (Broad-leaved Osier)

Praeger, 1902. 18, 21, 26.

Salix caprea (Goat Willow)

2-3, 6, 9, 13-15, 18-21, 23-26, 28-35.

Salix caprea x *S. cinerea*

On hill west of Portroe (McMullen, 1972; OP3). 22.

Salix cinerea subsp. *oleifolia* (Rusty Willow)

Redwood bog (Nash, 1992). 1-16, 18-35.

Salix cinerea x *S. aurita*

Clare Glens near Newport (Kelly, 1985; OP3); north of Terryglass Quay (Nash, 1992). 4, 12, 32.

Salix cinerea x *S. phylicifolia* (Laurel-leaved Willow)

[West side of Knockteige, 1992]. 13.

Salix aurita (Eared Willow)

Scrub at Lackamore east-south-east of Newport (McMullen, 1972). 4-9, 11-27, 29-35.

Salix repens subsp. *repens* (Creeping Willow)

4, 9, 24, 26, 35.

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BRASSICACEAE

Sisymbrium officinale (Hedge Mustard)
2-3, 10, 15-26, 28-29, 32-35.

Descurainia sophia (Flixweed)
Pavement edge, Roscrea (Reynolds, 1992). 31.

Alliaria petiolata (Garlic Mustard)
Toomevara; Silvermines; Borrisoleigh (ITB). 15-16, 18-20, 22-24, 26-27, 32-34.

Arabidopsis thaliana (Thale Cress)
Ballina (ITB). 2-3, 5,9-10, 16-17, 21, 23-26, 28-29, 31-32, 34.

Erysimum cheiranthoides (Treacle Mustard)
Between Birr and Portumna (Dowd - CybII); Brocka (Lilly, 1896); Borrisokane (Phillips - ITB); Roscrea (Reynolds, 1992). 8, 15, 18-24, 26-29, 31-35.

Erysimum cheiri (Wallflower)
Nenagh (Phillips - ITB). 22, 26, 29.

Hesperis matronalis (Dame's-violet)
Atlas; OP3. 1, 2, 5, 7, 9, 16, 18-19, 21-23, 26, 28-29, 31, 34.

Barbarea vulgaris (Winter-cress)
Near Killough bridge (Hart, 1885a). 9, 12-13, 15, 17-22, 26-29, 31-34.

Barbarea intermedia (Medium-flowered Winter-cress)
East of Templemore-Thurles road; Maudemount bog (Nash, 1993). 4, 16, 26.

Rorippa nasturtium-aquaticum (Water-cress)
West of Borrisokane (Scannell, 1968; OP3; OP5; DBN). 1-2, 4-10, 13, 15-19, 21-30, 32-34.

Rorippa nasturtium-aquaticum x *R. microphylla*
Atlas, OP3. 9, 17, 19-22, 28-29, 33.

Rorippa microphylla (Narrow-fruited Water-cress)
Atlas, OP3. 4, 9, 12, 14-24, 26-35.

Rorippa islandica (Northern Yellow-cress)
Bushfield; Cloughjordan; Barracurragh (ITB). 1, 4, 18-19, 23, 28, 33-35.

Rorippa amphibia (Great Yellow-cress)
Youghal Bay; Portumna (ITB). 22, 32-35.
Armoracia rusticana (Horse-radish)
Atlas, OP3. 26.
Cardamine pratensis (Cuckooflower)
4-7, 9, 12-15, 18-29, 31-35.
Cardamine flexuosa (Wavy Bitter-cress)
1-2, 4-32, 34.
Cardamine hirsuta (Hairy Bitter-cress)
2-5, 7, 10, 14-17, 19, 21-28, 31-34.
Arabis hirsuta (Hairy Rock-cress)
[Newchapel turlough (McMullen, 1968); esker ridge north of Nenagh, east of Ardcroney] (R. FitzGerald, 1991)]. 24, 28.
Draba muralis (Wall Whitlowgrass)
Bank and walls near Loughmore (Nash, 1993). 16.
Erophila verna (Common Whitlowgrass)
On walls of Priory, Templemore (Hart, 1885a). 2, 10, 16-17, 22-24, 26-27, 29, 31-33.
Capsella bursa-pastoris (Shepherd's-purse)
1-10, 12-13, 15-35.
Thlaspi arvense (Field Penny-cress)
Along Lower Brosna tributary, east of Templemore (Nash, 1993); roadsides (Reynolds, 1992). 2, 12, 16, 18, 25-26.
Lepidium heterophyllum (Smith's Pepperwort)
Toomevara; frequent in south west (ITB). 12-14, 18-19.
Coronopus squamatus (Swine-cress)
Dromineer (ITB). 22, 33.
Coronopus didymus (Lesser Swine-cress)
By old castle at Dromineer (Phillips - ITB). 10, 15, 17-18, 23.
Diplotaxis muralis (Annual Wall-rocket)
Templemore (Phillips - ITB).
Brassica rapa (Turnip)
2-5, 8-10, 15, 18, 26, 34.
Sinapis arvensis (Charlock)

Templemore (Phillips - ITB). 1-11, 13, 15-16, 18-21, 23-24, 26-29, 31-35.

Sinapis alba (White Mustard)

Toomevara; frequent throughout (ITB). 4, 15, 19, 26, 28, 34.

Erucastrum gallicum (Hairy Rocket)

North east of Birdhill (Doogue); Roscrea (Reynolds, 1992). 12, 39.

Raphanus raphanistrum subsp. *raphanistrum* (Wild Radish)

Nenagh (Phillips - ITB).

RESEDACEAE

Reseda luteola (Weld)

4, 9-11, 15-21, 23-24, 26, 29-35.

EMPETRACEAE

Empetrum nigrum (Crowberry)

Summit of Keeper (Hart, 1881). 13.

ERICACEAE

Rhododendron ponticum (Rhododendron)

3, 6, 11-13, 19-21, 27.

Andromeda polifolia (Bog-rosemary)

In a bog between Newport and Castleconnell (Mackay; 1806 etc.); Lough Ourna (ITB). 1, 24, 26-27, 29-35.

Calluna vulgaris (Heather)

Summit of Keeper (Hart, 1881); Maudemount bog, Annacarty (Nash and Fitzgerald, 1992). 1, 3-4, 6-7, 9, 12-15, 17-34.

Erica tetralix (Cross-leaved Heath)

7-9, 11, 13-14, 17-18, 21, 23-27, 29-35.

Erica cinerea (Bell Heather)

Keeper 2200' (Hart, 1881). 7, 12-14, 17-20, 22, 24-25, 27, 35.

Vaccinium oxycoccos (Cranberry)

Rapla; Barracurragh (ITB). 13, 21, 26, 31.

Vaccinium vitis-idaea (Cowberry)

Keeper Mountain (Jones - CybII); Keeper Hill at 2000' (Hart,

1881).
Vaccinium myrtillus (Bilberry)
Summit of Keeper (Hart, 1881). 3-4, 6-8, 12-14, 17-22, 25-27, 29-32, 35.

PYROLACEAE
Pyrola minor (Common Wintergreen)
Roscrea (How, 1650; Threlkeld, 1726) ?H10; Wood near Mount Butler (Phillips, 1924b).

PRIMULACEAE
Primula vulgaris (Primrose)
1-2, 4-11, 13-35.
Primula vulgaris x *P. veris*
Phillips - Praeger, 1934a; Praeger, 1951; west of Borrisokane and Roscrea (Nash, 1992). 25, 28.
Primula veris (Cowslip)
Lough Ourna; common in northern half (ITB). 2, 5, 18-26, 28-29, 31-35.
Hottonia palustris (Water-violet)
Phillips - Praeger, 1934a; Praeger, 1951; Glassdrum Lough south-south-west of Cappawhite (Lockhart - Nash, 1992). 3.
Lysimachia nemorum (Yellow Pimpernel)
3-4, 6, 8, 12-15, 17-22, 24-32.
Lysimachia nummularia (Creeping-Jenny)
Lough Derg, south of Kilgarvan Quay (McMullen, 1972). 9, 28-29, 32, 35.
Lysimachia vulgaris (Yellow Loosestrife)
Nenagh; common at Lough Derg (ITB); 5, 9, 15, 17, 22-24, 28-29, 32-33.
Anagallis tenella (Bog Pimpernel)
4-5, 8-9, 12, 15, 17-20, 22-24, 26, 28-30, 32-33, 35.
Anagallis arvensis (Scarlet Pimpernel)
1, 2, 4, 8-11, 13, 15, 18-20, 22-24, 26, 28-34.

Samolus valerandi (Brookweed)
Abundant round shore of Lough Derg and islands (Colgan, 1897).
9, 15, 18, 22-24, 28, 30, 33-35.

GROSSULARIACEAE
Ribes rubrum (Red Currant)
23.
Ribes nigrum (Black Currant)
Atlas; OP3. 19, 22-23, 28, 32.
Ribes sanguineum (Flowering Currant)
7, 18, 21, 23-24, 28.
Ribes uva-crispa (Gooseberry)
Atlas; OP3. 1, 4, 9, 14, 23-24, 28-29, 32, 34.

CRASSULACEAE
Umbilicus rupestris (Navelwort)
Devil's Bit at 1500' (Hart, 1885a). 6, 11-13, 17-23, 26-28.
Sedum forsterianum (Rock Stonecrop)
Atlas; OP3.
Sedum acre (Biting Stonecrop)
Ryan's Point; on rocks at Dromineer (Colgan, 1897); Nenagh (ITB).
2, 9-10, 16, 18-19, 22-24, 26, 28-29, 32-34.
Sedum album (White Stonecrop)
Plentiful at Roscrea (Phillips - ITB). 1, 5, 9-11, 16-20, 22-23, 28-29, 32.
Sedum anglicum (English Stonecrop)
Wall of workhouse, south of Roscrea (McMullen, 1972; OP3).
9-10, 15, 18, 22, 26, 28, 34.

SAXIFRAGACEAE
Saxifraga hirculus (Marsh Saxifrage)
In marsh three miles from Cloughjordan (Hodgens - Mackay, 1836; CybII).
Saxifraga tridactylites (Rue-leaved Saxifrage)

Old walls at Priory, Templemore (Hart, 1885a); Nenagh (ITB).
2, 10, 18, 21, 24, 26, 28-29, 32, 34.
Chrysospleniun oppositifolium (Opposite-leaved Golden-saxifrage)
3-4, 6, 8, 12-15, 17-22, 26, 28, 34.
Parnassia palustris (Grass-of-Parnassus)
Along railway in Tipperary [H7/10] (Harvey - ITB); Rapla Bog and north west (ITB). 8-9, 12, 14, 17, 19, 22-23, 26, 28-30, 32, 35.

ROSACEAE
Spiraea salicifolia (Bridewort)
Atlas; OP3.
Spiraea douglasii (Steeplebush)
Boggy ditch, north of Kilboy estate (McMullen - Nash, 1991). 14, 18.
Filipendula ulmaria (Meadowsweet)
1-9, 11-35.
Rubus saxatilis (Stone Bramble)
Lough Derg below Portumna; Cloughjordan (ITB). 24, 30, 34.
Rubus idaeus (Raspberry)
Eastern slope of Benduff (Hart, 1885a) 4, 7, 9, 12-14, 17-22, 26-27, 29-33, 35.
Rubus idaeus x *R. caesius*
Borrisokane-Cloughjordan road, 1967 (Scannell, pers. comm.; OP3). 24/29.
Rubus fruticosus s.l. (Bramble)
1-35.
Rubus amplificatus
Newton, 1986; Killeen on north west of Ballinacurra Hill; bogland north west of Carrigahorig (Allen, 1990). 18-19, 32.
Rubus cardiophyllus
Killeen on north west of Ballinacurra Hill (Allen, 1990). 19.
Rubus nemoralis
Bogland north west of Carrigahorig (Allen, 1990). 32.
Rubus polyanthemus

Near Latteragh; bogland north west of Carrigahorig (Allen, 1990). 19, 32.

Rubus subinermoides

Around plantation at Latteragh (Allen, 1990). 19.

Rubus lamburnensis

Newton, 1986. 18.

Rubus ulmifolius

1, 4, 14-15, 19, 22-24, 26, 28, 30, 32, 34-35.

Rubus lanaticaulis

Newton, 1986. 32.

Rubus vestitus

Around plantation at Latteragh; north west of Carrigahorig (Allen, 1990). 19, 32.

Rubus melanodermis

Around plantation at Latteragh (Allen, 1990). 19.

Rubus raduloides

Killeen on north west of Ballinacurra hill; bog north west of Carrigahorig (Allen, 1990, 1993). 19, 32-33.

Rubus adenanthoides

Lane at Latteragh, south west of Toomevara (Allen, 1993; BM). 19.

Rubus largificus

Roadsides on north west of Ballinacurra Hill (Allen, 1993; BM). 19.

Rubus longithyrsiger

Roadside east of Lackamore (Nash - Allen, 1993). 13.

Rubus radula

Hedges east of Nenagh (Allen, 1990). 19.

Rubus caesius (Dewberry)

Abundant on limestone (Colgan, 1897); Cloughjordan (ITB). 4, 9-10, 15-16, 18, 21-24, 26, 28-34.

Potentilla palustris (Marsh Cinquefoil)

3-5, 7, 13, 22, 25-26, 33-34.

Potentilla anserina (Silverweed)

1-35.

Potentilla erecta (Tormentil)
Summit of Keeper (Hart, 1881). 1, 3-4, 6-35.
Potentilla erecta x *P. anglica*
Praeger, 1902.
Potentilla anglica (Trailing Tormentil)
Dromineer (Phillips - ITB). 1, 3-4, 7, 9, 11-16, 18-24, 26-35.
Potentilla reptans (Creeping Cinquefoil)
1-2, 4-5, 8-26, 28-35.
Potentilla sterilis (Barren Strawberry)
4, 6, 8-10, 12, 14-15, 17-24, 26-34.
Fragaria vesca (Wild Strawberry)
1-10, 12-34.
Geum rivale (Water Avens)
Brosna tributary; bank of Suir, north of Templemore (Hart, 1885a); Silvermines (ITB); wood near Anne Grove House (Nash, 1992). 12, 14, 25, 31, 33.
Geum urbanum (Wood Avens)
1-9, 12-16, 18-35.
Agrimonia eupatoria (Agrimony)
1, 4, 9-11, 14-15, 19, 21, 23-33.
Agrimonia procera (Fragrant Agrimony)
North of Lough Derg (McClintock, 1959). 9, 15, 19-20, 25.
Sanguisorba minor (Salad Burnet)
Banks near Dromineer (Colgan, 1897); Roscrea (Phillips); Roscrea (ITB). 26, 28, 32.
Alchemilla xanthochlora (Intermediate Lady's-mantle)
Shore of Lough Derg, south of Kilbarron Quay (McMullen, 1972). 23, 28.
Alchemilla filicaulis subsp. *vestita* (Hairy Lady's-mantle)
Five stations, all in the north (Webb, 1952b). 12-15, 18-24, 26-31, 35.
Alchemilla glabra (Smooth Lady's-mantle)
Youghal Bay (Webb, 1952b). 17.
Aphanes arvensis (Parsley-piert)

Atlas; OP3. 10, 15, 18-20, 22-24, 28-30, 34.
Aphanes inexspectata (Slender Parsley-piert)
Atlas; OP3. 13-15, 18-20, 22, 26, 30.
Rosa arvensis (Field-rose)
Roadside between Newport and Keeper (Hart, 1881); Dromineer (Phillips - ITB). 2, 4, 16, 19-20, 22, 26, 28-29, 31-34.
Rosa pimpinellifolia (Burnet Rose)
22-24, 26, 28-29, 32-34.
Rosa pimpinellifolia x *R. sherardii*
Wall by Fishmoyne river, south of Kilfithmore Cross (McMullen, 1972). 15.
Rosa stylosa x *R. canina*
East of Nenagh; Carigahorig (Nash, 1993). 4, 19, 33.
Rosa canina (Dog-rose)
1-6, 8-10, 12-16, 18-35.
Rosa canina x *R. obtusifolia* (Thicket Dog-rose)
Hedgerows near Ballinree; Killeen (Nash, 1993). 19, 33.
Rosa tomentosa agg. (Harsh Downy-rose)
19, 24, 32-33.
Rosa sherardii (Sherard's Downy-rose)
Hedge, south of pond at Castle Otway, (McMullen, 1972; OP3). 4, 14, 33.
Rosa sherardii x *R. agrestis*
Shore of Lough Derg, south of Garrykennedy (McMullen, 1972; OP3); shores of Lough Derg (Stace, 1975). 18, 22.
Rosa mollis (Soft Downy-rose)
Hedge, west of Borrisoleigh (McMullen, 1972; OP3). 15, 21, 26.
Rosa rubiginosa (Sweet-briar)
Roadside, south of Park, Templemore (McMullen, 1972). 21, 23-24.
Rosa agrestis (Small-leaved Sweet-briar)
Lough Derg near Portumna (Phillips - ITB); Lough Derg near Carrigahorig (Nash, 1992). 28.
Prunus spinosa (Blackthorn)
1-35.

Prunus domestica subsp. *insititia* (Wild Plum)
1, 3, 9, 10, 13, 15, 18-21, 23-24, 26, 28-30, 33-35.
Prunus avium (Wild Cherry)
Atlas; OP3. 2-3, 6, 10, 13, 17, 19-20, 22-24, 26-30, 34.
Prunus cerasus (Dwarf Cherry)
Barracurragh; Nenagh: Cloughjordan (ITB). 4, 21, 24, 26, 29, 33, 35.
Prunus padus (Bird Cherry)
North base of Keeper Hill (ITB). 26, 28-29, 31.
Prunus lusitanica (Portugal Laurel)
18.
Prunus laurocerasus (Cherry Laurel)
1, 3, 6, 8-10, 13, 15, 19-21, 23, 26, 28-30, 32, 35.
Pyrus pyraster (Wild Pear)
Atlas (H7/10); OP3.
Malus sylvestris (Crab Apple)
5, 8-9, 12-13, 17-24, 28-34.
Malus domestica (Apple)
1-3, 5, 22, 25, 28, 33, 35.
Sorbus aucuparia (Rowan)
3-4, 6-8, 11-14, 17-30, 33-35.
Sorbus aria agg. (Common Whitebeam)
Dromineer; Friar's Lough (ITB). 19, 26.
Sorbus hibernica (Irish Whitebeam)
Rocks at Terryglass (Praeger, 1934). 11, 22-23, 25-26, 28, 32, 34.
Cotoneaster integrifolius (Small-leaved Cotoneaster)
Frequent on Lough Derg shores; Kilgarvan Quay (McMullen, 1972). 2, 5, 28, 32.
Cotoneaster horizontalis (Wall Cotoneaster)
22, 28, 34.
Cotoneaster simonsii (Himalayan Cotoneaster)
Lauragh, Kilregane, Nenagh, (Darcy, DBN; OP3; OP5). 10-11, 22.
Crataegus monogyna (Hawthorn)
1-35.

Crataegus laevigata (Midland Hawthorn)
A single tree north of Ballina (Webb, 1945).

FABACEAE
Anthyllis vulneraria (Kidney Vetch)
Dromineer (Colgan, 1897). 9-10, 20, 22-24, 28-29, 31-32.
Lotus corniculatus (Common Bird's-foot-trefoil)
1-35.
Lotus pedunculatus (Greater Bird's-foot-trefoil)
3-4, 6-9, 11-13, 15, 17-23, 31.
Vicia cracca (Tufted Vetch)
1-6, 8-35.
Vicia hirsuta (Hairy Tare)
Phillips - Praeger, 1934a. 2, 4, 15, 17, 19-20, 26-27, 32.
Vicia sepium (Bush Vetch)
1-35.
Vicia sativa subsp. *nigra* (Common Vetch)
Rapla; Dromineer (Phillips - ITB). 1-2, 4, 5, 7, 12, 17, 19, 21-23, 25-35.
Lathyrus linifolius (Bitter-vetch)
South of Keeper and Ballyhourigan wood (Hart, 1881); east slope of Benduff (Hart, 1885a). 4, 6-9, 12-15, 17-20, 22, 24, 26, 28-31.
Lathyrus pratensis (Meadow Vetchling)
1-5, 7-35.
Lathyrus palustris (Marsh Pea)
North of carpark at Luska (Goodwillie - McMullen, 1972); north shore of Youghal Bay (Nash, 1992). 20, 22, 23, 28.
Ononis repens (Commom Restharrow)
Praeger, 1906. 24-25.
Medicago lupulina (Black Medick)
1-7, 9-11, 13, 15-16, 19-24, 27-35.
Medicago sativa (Lucerne)
Dromineer (Phillips); Cloughjordan (ITB).

Trifolium repens (White Clover)
1-35.
Trifolium hybridum (Alsike Clover)
15, 26, 28, 32-34.
Trifolium campestre (Hop Trefoil)
2, 4, 9-10, 15-18, 20-22, 24, 26, 28, 32-34.
Trifolium dubium (Lesser Trefoil)
2-5, 8-12, 14-29, 31-35.
Trifolium micranthum (Slender Trefoil)
Lough Derg near Ballyeiragh bridge; Portumna (Praeger, 1934a).
Trifolium pratense (Red Clover)
1-5, 7-35.
Trifolium medium (Zigzag Clover)
Cloughjordan; Thurles; Portumna (ITB). 7, 16, 21-22, 24, 26, 28-29, 32, 34.
Laburnum anagyroides (Laburnum)
[Maudemount bog, Annacarty (1991); at Newchapel Turlough (1992)].
4, 28.
Cytisus scoparius (Broom)
6-7, 11-13, 18-20.
Ulex europaeus (Gorse)
1-35.
Ulex gallii (Western Gorse)
Clare Glen (Hart, 1881); Arra Mountains (ITB). 12-13, 17-18, 20, 22.

HALORAGACEAE
Myriophyllum verticillatum (Whorled Water-milfoil)
Roscrea (Phillips); Friar's Lough; Portumna (ITB). 23, 32, 35.
Myriophyllum spicatum (Spiked Water-milfoil)
11, 18, 21-24, 28-30, 32-35.
Myriophyllum alterniflorum (Alternate Water-milfoil)
Between Knockane Bridge and railway, (Hart, 1885a); Lough Ourna (ITB). 9, 23-24, 28-29, 32, 34.

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GUNNERACEAE

Gunnera tinctoria (Giant-rhubarb)

Shore of Lough Derg, near Waterloo Lodge (McMullen - Nash, 1991). 28.

LYTHRACEAE

Lythrum salicaria (Purple-loosestrife)

1-4, 8-9, 11-12, 15-24, 26-31, 33-35.

Lythrum portula (Water-purslane)

Templemore (ITB); Maudemount bog, Annacarty (Nash and Fitzgerald, 1992). 1, 12, 14, 19, 22.

ONAGRACEAE

Epilobium hirsutum (Great Willowherb)

1-5, 7-13, 15-35.

Epilobium parviflorum (Hoary Willowherb)

1-4, 7-15, 17-35.

Epilobium montanum (Broad-leaved Willowherb)

2-4, 7-10, 12-15, 17-34.

Epilobium obscurum (Short-fruited Willowherb)

1, 3-4, 9-10, 12-15, 17, 19-21, 23-24, 26-29, 33-35.

Epilobium ciliatum (American Willowherb)

Laneway near the bridge, Borrisokane (Sharkey - Doogue and Kelly). 2, 9, 19, 29, 33.

Epilobium palustre (Marsh Willowherb)

1-4, 7-9, 11, 13-21, 23-24, 26-30, 32-35.

Epilobium brunnescens (New Zealand Willowherb)

Hill north east of New Grove (Nash, 1993). 12, 13, 18, 25.

Chamerion angustifolium (Rosebay Willowherb)

Atlas; OP3. 9, 12, 18-19, 21-26, 31-33.

Fuchsia magellanica (Fuchsia)

3, 7-8, 14, 18-20, 22, 28.

Circaea lutetiana (Enchanter's-nightshade)

3-4, 7-9, 13, 15, 17-24, 26-34.

CORNACEAE
Cornus sanguinea (Dogwood)
Bounla island (Colgan, 1897; CybII). 34.

CELASTRACEAE
Euonymus europaeus (Spindle)
By Bunnow river near railway, west of Roscrea (McMullen, 1972; OP3); Redwood bog (Nash, 1992). 9, 15-16, 18-19, 21-35.

AQUIFOLIACEAE
Ilex aquifolium (Holly)
3-10, 12-35.

EUPHORBIACEAE
Mercurialis perennis (Dog's Mercury)
Near mill at Bunrevan (McMullen, 1972). 34.
Euphorbia helioscopia (Sun Spurge)
3, 8-10, 15, 18-20, 22-24, 26, 28-29, 31-34.
Euphorbia lathyris (Caper Spurge)
Youghalarra, near Nenagh [Geraghty, 1992]. 22.
Euphorbia exigua (Dwarf Spurge)
Dromineer (Phillips); Cloughjordan; Lough Ourna (ITB). 28, 33-34.
Euphorbia peplus (Petty Spurge)
15, 18-20, 23-24, 26, 28-29, 31-32, 34.

RHAMNACEAE
Rhamnus cathartica (Buckthorn)
Near Newport (Hart, 1881); Corrikeen; Bounla; Scilly islands; Ryan's Point (Colgan, 1897); Ballingarry; Barracurragh (ITB); Redwood bog (Nash, 1992). 22-24, 26, 28-29, 32-35.
Frangula alnus (Alder Buckthorn)
Friar's Lough in profusion (Praeger, 1899); Friar's Lough; Redwood bog (Nash, 1992; Nash and Fitzgerald, 1992). 33,35.

LINACEAE
Linum bienne (Pale Flax)
Lough Derg at Youghal bay (FitzGerald - Nash, 1993). 22.
Linum catharticum (Fairy Flax)
4, 8-10, 13-16, 18-24, 26-35.

POLYGALACEAE
Polygala vulgaris (Commom Milkwort)
5, 7-8, 12-14, 16, 18-35.
Polygala serpyllifolia (Heath Milkwort)
3, 5, 7, 13-15, 17-21, 24-26, 31-32, 35.

HIPPOCASTANACEAE
Aesculus hippocastanum (Horse-chestnut)
1, 4, 6, 8, 9, 11, 15, 18-19, 21, 23-27, 29-30, 32, 34.

ACERACEAE
Acer campestre (Field Maple)
Mixed wood at Kilboy House (McMullen - Nash, 1991); Maudemount bog, Annacarty (Nash and Fitzgerald, 1992). 4, 18.
Acer pseudoplatanus (Sycamore)
1-35.

OXALIDACEAE
Oxalis acetosella (Wood-sorrel)
6-9, 11-15, 17, 19-27, 29-31, 33-34.

GERANIACEAE
Geranium endressii (French Crane's-bill)
Scrub, south west of Modreeny; roadside, south of Toomevara (McMullen - Nash, 1991). 19, 24.
Geranium endressii x *G. versicolor* (Druce's Crane's-bill)
19.
Geranium versicolor (Pencilled Crane's-bill)

29.
Geranium pratense (Meadow Crane's-bill)
Atlas; OP3. 19, 35.
Geranium sanguineum (Bloody Crane's-bill)
At Drominagh (Lilly, 1896); near Ballyeiragh (Praeger, 1899); esker near Cloughjordan; Lough Derg frequent (ITB). 24, 26, 28, 32.
Geranium columbinum (Long-stalked Crane's-bill)
Lough Derg near Dromineer (ITB). 28-29, 32.
Geranium dissectum (Cut-leaved Crane's-bill)
1-6, 9-10, 13-16, 18-23, 28-34.
Geranium pyrenaicum (Hedgerow Crane's-bill)
Roadsides near Portroe (Phillips, 1924a). 33.
Geranium molle (Dove's-foot Crane's-bill)
4, 10, 15-16, 18-19, 21-24, 26, 28-29, 32-34.
Geranium lucidum (Shining Crane's-bill)
Drominagh (Colgan, 1897). 2, 6, 28, 32.
Geranium robertianum (Herb-Robert)
Drominagh (Colgan, 1897). 1-29, 31-35.
Geranium phaeum (Dusky Crane's-bill)
East side of Shannon at Killaloe (Scannell, DBN; OP3; OP5). 17.

BALSAMINACEAE
Impatiens glandulifera (Indian Balsam)
By Bunnow river near railway, west of Roscrea (McMullen, 1972; OP3). 3, 26, 28, 32.

ARALIACEAE
Hedera helix (Ivy)
1-35.

APIACEAE
Hydrocotyle vulgaris (Marsh Pennywort)
3-5, 9, 15-16, 18-24, 26-35.

Sanicula europaea (Sanicle)
3-5, 8-9, 12-28, 30-34.
Chaerophyllum temulum (Rough Chervil)
Dromineer; Thurles (ITB). 19.
Anthriscus sylvestris (Cow Parsley)
1-27, 29, 31, 33-35.
Anthriscus caucalis (Bur Parsley)
Roscrea (Phillips - ITB).
Scandix pecten-veneris (Shepherd's-needle)
Nenagh (ITB).
Smyrnium olusatrum (Alexanders)
10, 19, 23, 26, 29, 33, 35.
Conopodium majus (Pignut)
Devil's Bit, 1050' (Hart, 1885a). 3-9, 11-12, 14, 16, 18-28, 30-35.
Pimpinella major (Greater Burnet-saxifrage)
Roadside near Newport (Hart, 1881); Roscrea (Phillips - ITB). 2-3, 14-15.
Pimpinella saxifraga (Burnet-saxifrage)
4, 8-10, 13-16, 18-24, 26-35.
Aegopodium podagraria (Ground-elder)
1-2, 4-5, 8-10, 15-16, 18-19, 21-26, 29-33, 35.
Sium latifolium (Greater Water-parsnip)
East of Shannon at Portumna (Dowd - CybII). 32, 35.
Berula erecta (Lesser Water-parsnip)
Nenagh; frequent in the west (ITB). 1, 3-4, 18, 22-23, 28, 32, 34-35.
Oenanthe fistulosa (Tubular Water-dropwort)
Drains near Portumna bridge (Phillips, 1924a); Maudemount bog, Annacarty (Nash and Fitzgerald, 1992); Shannon, south of Ballymacegan island (Heery, 1991). 4, 32, 33, 35.
Oenanthe crocata (Hemlock Water-dropwort)
Youghal Bay and base of Keeper Hill (ITB). 5-9, 11-19, 21-24, 28-29, 32, 34.

Oenanthe fluviatilis (River Water-dropwort)
Praeger, 1934a. 32, 34.
Oenanthe aquatica (Fine-leaved Water-dropwort)
9, 19, 28, 34-35.
Aethusa cynapium (Fool's Parsley)
5, 7, 13-15, 18-23, 26, 30, 32, 35.
Foeniculum vulgare (Fennel)
Roadside, west of Nenagh (Gunn - Praeger, 1908).
Conium maculatum (Hemlock)
2, 4, 9-10, 14-19, 21, 23-26, 28-35.
Apium nodiflorum (Fool's Water-cress)
1-6, 9, 11, 15-26, 28-35.
Apium inundatum (Lesser Marshwort)
21, 23, 28-29, 32, 34.
Angelica sylvestris (Wild Angelica)
1-9, 11-35.
Pastinaca sativa (Parsnip)
Sandpit by Ollatrim river, south of Moneygall (McMullen, 1972).
20, 31.
Heracleum sphondylium (Hogweed)
1-35.
Heracleum sphondylium x *H. mantegazzianum*
Lower Brosna river, Bunrevan (Hart, DBN; OP3; OP5). 34.
Heracleum mantegazzianum (Giant Hogweed)
Newport river above Bunkey bridge, (Bennis - Praeger, 1939); Lower Brosna river, Bunrevan (Hart; OP3; OP5; DBN). 3, 11-12, 34.
Torilis japonica (Upright Hedge-parsley)
1-4, 7-16, 18-26, 35.
Torilis nodosa (Knotted Hedge-parsley)
Nenagh (ITB). 15.
Daucus carota (Wild Carrot)
1, 3, 4, 7, 9-11, 15-26, 28-29, 32-35.

GENTIANACEAE

Centaurium erythraea (Common Centaury)

3, 9-12, 15-19, 22-24, 26, 28-35.

Blackstonia perfoliata (Yellow-wort)

Lough Ourna; commmon in northern half (ITB). 18-19, 22-26, 28-29, 32, 34.

Gentianella campestris (Field Gentian)

Esker near Cloughjordan (ITB); Ballyspillane (Phillips, 1925; DBN).

Gentianella amarella (Autumn Gentian)

Derry Isle; Slevoir; Dromineer, on limestone (Colgan, 1897); Dromineer (Phillips); frequent in north western half (ITB).

23, 29, 34.

APOCYNACEAE

Vinca minor (Lesser Periwinkle)

19, 22, 32.

Vinca major (Greater Periwinkle)

1, 4, 19.

SOLANACEAE

Lycium barbarum (Duke of Argyll's Teaplant)

Hedge at Borrisokane, (McMullen - Nash, 1993). 29, 35.

Hyoscyamus niger (Henbane)

Holycross (Madden - CybI, ITB).

Solanum nigrum (Black Nightshade)

At Lorrha (Sharkey - Nash, 1993). 33.

Solanum dulcamara (Bittersweet)

Along railway, north east of Roscrea (McMullen, 1972). 3-5, 9, 16, 18, 20-23, 26-29, 34-35.

CONVOLVULACEAE

Convolvulus arvensis (Field Bindweed)

Roscrea (Phillips - ITB). 1, 10, 15, 17-19, 21-22, 24-27, 31, 34,

35.
Calystegia sepium (Hedge Bindweed)
1-2, 4, 9-11, 15, 18-24, 26-35.
Calystegia pulchra (Hairy Bindweed)
Atlas; OP3. 19.
Calystegia silvatica (Large Bindweed)
10, 17, 35.

MENYANTHACEAE
Menyanthes trifoliata (Bogbean)
1, 3-5, 9, 13-15, 19, 21-24, 26, 28-35.

BORAGINACEAE
Lithospermum officinale (Common Gromwell)
Praeger, 1906. 21, 29, 32-34.
Symphytum officinale (Common Comfrey)
4, 6, 15, 21, 26, 28-29, 34.
Symphytum officinale x *S. asperum* (Russian Comfrey)
Drominagh House; near Lisduff station, (McMullen - Nash, 1991).
17, 21, 28-29, 32.
Pentaglottis sempervirens (Green Alkanet)
North of church near Clareen Lough (McMullen, 1972; OP3). 23.
Myosotis scorpioides (Water Forget-me-not)
1, 3-5, 7, 9, 11, 13, 15, 18-35.
Myosotis secunda (Creeping Forget-me-not)
Base of Keeper; Devil's Bit (ITB). 7, 12-14, 18-21, 23, 28, 31-35.
Myosotis laxa subsp. *caespitosa* (Tufted Forget-me-not)
1, 3-4, 6, 8-9, 13-16, 18-24, 26, 28-30, 32, 34-35.
Myosotis arvensis (Field Forget-me-not)
1-4, 8, 10, 12, 15-34.
Myosotis discolor (Changing Forget-me-not)
Devil's Bit, 1150' (Hart, 1885a). 7, 13-15, 19, 21-22, 24, 31, 33.

VERBENACEAE
Verbena officinalis (Vervain)
Dromineer (Phillips - ITB). 19, 28, 32.

LAMIACEAE
Stachys officinalis (Betony)
Woods near Tullagh, Barony of Oonagh, Tipperary (Keogh, 1735 - CybII).
Stachys sylvatica (Hedge Woundwort)
1-5, 7-13, 15-24, 26-35.
Stachys sylvatica x *S. palustris* (Hybrid Woundwort)
Praeger, 1952; riverside at Borrisokane (Sharkey - Nash, 1993). 29, 32.
Stachys palustris (Marsh Woundwort)
1-2, 4, 7-9, 11-16, 18-35.
Stachys arvensis (Field Woundwort)
Potato field opposite Latteragh National School (McMullen, 1972). 19.
Ballota nigra subsp. *foetida* (Black Horehound)
Dromineer (Phillips - ITB). 32.
Leonurus cardiaca (Motherwort)
In hedges and among rubbish (Walford, 1818).
Lamium album (White Dead-nettle)
[Templemore station yard (Nash, 1992)]. 21.
Lamium purpureum (Red Dead-nettle)
1, 3-4, 8-10, 15-16, 18-20, 22-24, 26, 28-29, 31-35.
Lamium hybridum (Cut-leaved Dead-nettle)
Near Roscrea (Phillips, 1924a). 19, 33-34.
Lamium confertum (Northern Dead-nettle)
Roscrea (Phillips - ITB).
Lamium amplexicaule (Henbit Dead-nettle)
Near Bunrevan House (McMullen - Nash, 1993). 34.
Galeopsis tetrahit (Common Hemp-nettle)
8, 13, 15, 19-21, 23, 26-27, 29-34.

Marrubium vulgare (White Horehound)
Dromineer (ITB).
Scutellaria galericulata (Skullcap)
Praeger, 1906; Annacarty (Nash and Fitzgerald, 1992). 4, 17, 20, 22-24, 32.
Teucrium scorodonia (Wood Sage)
12-14, 17-20, 22-23, 28.
Teucrium scordium (Water Germander)
Near Portumna bridge (Mackay, 1806 etc.); Drominagh (Lilly, 1896); Derry Isle; Gortmore; Bounla Island; Ryan's Point (Colgan, 1897); on the shore of Ballyspillane Lake, near Borrisokane (Phillips 1924b). 28, 29, 32.
Ajuga reptans (Bugle)
Devil's Bit 1300' (Hart, 1885a). 6, 8-9, 13-33.
Glechoma hederacea (Ground-ivy)
1, 4, 6, 8-9, 11-12, 14-35.
Prunella vulgaris (Selfheal)
1-2, 4, 6-35.
Melissa officinalis (Balm)
Roadside at Templederry (McMullen - Nash, 1991). 14.
Clinopodium ascendens (Common Calamint)
Cloughjordan (Phillips - ITB). 14, 19.
Clinopodium acinos (Basil Thyme)
Near Nenagh (Vowell - CybII). 19-20.
Origanum vulgare (Wild Marjoram)
Near Dromineer; on Corrikeens (Colgan, 1897); Lough Ourna (ITB). 9, 18, 20, 23, 28-32, 34-35.
Thymus pulegioides (Large Thyme)
Terryglass near Portumna (Praeger, 1934a).
Thymus polytrichus subsp. *britannicus* (Wild Thyme) 17-18, 22-26, 28-35.
Lycopus europaeus (Gypsywort)
Skehanagh Bridge (Hart, 1881, 1885a); Dromineer (Phillips - ITB). 4-5, 17, 19, 22-24, 28, 30, 32-35.

Mentha arvensis (Corn Mint)
9, 15, 18-21, 24, 26-30, 32-35.
Mentha arvensis x *M. aquatica* (Whorled Mint)
Portumna (Phillips); Dromineer (ITB). 27, 28, 32, 34.
Mentha arvensis x *M. spicata* (Bushy Mint)
Lower Brosna river at New Bridge (McMullen - Nash, 1991). 15.
Mentha aquatica (Water Mint)
1-9, 11-35.
Mentha aquatica x *M. spicata* (Peppermint)
Balintotty river banks south east of Toomevara (McMullen, 1972, OP3).
Mentha spicata (Spear Mint)
Lower Brosna at New Bridge (McMullen - Nash, 1991). 28, 32, 34.
Mentha suaveolens (Round-leaved Mint)
Near Birr (Phillips - Praeger, 1934a). 2.

HIPPURIDACEAE
Hippuris vulgaris (Mare's-tail)
4-5, 9, 16-17, 21-24, 26, 28-30, 32-35.

CALLITRICHACEAE
Callitriche stagnalis (Common Water-starwort)
Between Devil's Bit and Knockanora (ITB). 2-6, 8-9, 12, 14-20, 22-26, 31, 33.
Callitriche platycarpa (Various-leaved Water-starwort)
Kilduff at 1400' (Hart, 1885b). 29.
Callitriche obtusangula (Blunt-fruited Water-starwort)
9, 15, 19, 21-22, 26, 29, 31-32, 34-35.
Callitriche hamulata (Intermediate Water-starwort)
Praeger, 1906. 13, 17, 32.

PLANTAGINACEAE
Plantago maritima (Sea Plantain)
Dromineer (Phillips - ITB); Lough Derg, up to 25 miles from sea

(Praeger, 1934). 22-23, 28, 32.
Plantago major (Greater Plantain)
1-35.
Plantago lanceolata (Ribwort Plantain)
1-35.
Littorella uniflora (Shoreweed)
17, 22-23, 28-29, 32.

BUDDLEJACEAE
Buddleja davidii (Butterfly-bush)
Roadsides near Bushfield and Roscrea (Nash, 1993). 14, 17-19, 22, 29.

OLEACEAE
Fraxinus excelsior (Ash)
1-35.
Syringa vulgaris (Lilac)
4, 10, 22-24, 26, 33.
Ligustrum vulgare (Wild Privet)
Appears native on Lough Derg shores (Praeger, 1934a). 1, 3-5, 7-8, 10-13, 15-16, 18-35.

SCROPHULARIACEAE
Verbascum thapsus (Great Mullein)
Roscrea (Phillips - ITB). 2, 10, 23, 26, 28-29.
Scrophularia nodosa (Common Figwort)
1-5, 7-13, 15-35.
Scrophularia auriculata (Water Figwort)
Gortmore at Drominagh (Colgan, 1897). 6, 8-9, 15, 17-24, 31-32, 34.
Mimulus moschatus (Musk)
Clodiagh river south east of Drumgill House (McMullen, 1972). 15, 17, 32.
Chaenorhinum minus (Small Toadflax)

On railways in North Tipperary (ITB). 10, 20-21, 23, 26-27, 34-35.
Cymbalaria muralis (Ivy-leaved Toadflax)
2, 9-10, 14, 17-18, 20-22, 24, 26, 29.
Linaria purpurea (Purple Toadflax)
[Walls at Ivy Hall Cross; Loughkeen (McMullen, 1972)]. 30.
Linaria repens (Pale Toadflax)
[At Loughkeen (McMullen, 1972)]. 30.
Digitalis purpurea (Foxglove)
3-9, 12-15, 17-22, 25-27, 31.
Erinus alpinus (Fairy Foxglove)
Walls at Sopwell House (McMullen, 1972). 23-24, 29.
Veronica serpyllifolia (Thyme-leaved Speedwell)
2-5, 7-8, 10, 12-29, 31, 33-34.
Veronica officinalis (Heath Speedwell)
3-4, 6-7, 9,12-15, 17-32, 34-35.
Veronica chamaedrys (Germander Speedwell)
1-35.
Veronica montana (Wood Speedwell)
Lough Ourna; Cloughjordan (Phillips - ITB). 4, 7-9, 13, 15, 18-21, 25-26, 28, 31-33.
Veronica scutellata (Marsh Speedwell)
3-4, 9, 12-13, 18-24, 26, 28-29, 32-35.
Veronica beccabunga (Brooklime)
1-9, 11-35.
Veronica anagallis-aquatica (Blue Water-speedwell)
1, 2, 4, 7, 9-10, 14-16, 18-24, 26-35.
Veronica catenata (Pink Water-speedwell)
Atlas, OP3. 4, 8, 15-16, 19-20, 22-23, 28-29, 32, 34-35.
Veronica arvensis (Wall Speedwell)
2, 5, 9-11, 14-16, 18-26, 28-34.
Veronica agrestis (Green Field-speedwell)
Nenagh; frequent (ITB). 2, 18, 21, 23, 26, 33.
Veronica polita (Grey Field-speedwell)
Nenagh; frequent (ITB).

Veronica persica (Common Field-speedwell)
2-4, 8-10, 12, 14-16, 18-24, 26-29, 31-35.
Veronica filiformis (Slender Speedwell)
Garden weed ex BSBI Maps Scheme (Bangerter and Kent, 1962). 1, 4, 9, 18, 22-24, 26, 29-30, 32-33.
Veronica hederifolia (Ivy-leaved Speedwell)
16, 22, 26, 32.
Melampyrum pratense (Common Cow-wheat)
Keeper Hill at 2200' (Hart, 1881). 6, 14, 21, 24-25.
Euphrasia rostkoviana subsp. *rostkoviana* (Eyebright)
Between "Lookout", west of Portroe, and Lough Derg (McMullen, 1972). 8, 13-16, 18-23, 26-27, 29-32, 34-35.
Euphrasia anglica
Praeger, 1934a. 19.
Euphrasia arctica subsp. *borealis*
6, 8-24, 26-35.
Euphrasia nemorosa
In grounds of Sopwell House (McMullen, 1972). 26, 29, 32.
Euphrasia confusa
By river, two miles north-north-east of Borrisokane (McMullen, 1972; OP3). 29.
Euphrasia micrantha
Between Devil's Bit and Ballyhourigan (Praeger, 1902). 8, 13, 17, 20-21, 24, 29-30.
Euphrasia scottica
Near Lower Brosna between Bunrevan and Birr (McMullen, 1972). 24, 34.
Odontites vernus (Red Bartsia)
1-4, 8-9, 11-12, 15-16, 18-24, 26, 28-35.
Rhinanthus minor (Yellow-rattle)
2-35.
Pedicularis palustris (Marsh Lousewort)
3-6, 8-9, 12-15, 18-20, 22-24, 26-29, 32-35.
Pedicularis sylvatica (Lousewort)

3-4, 7-9, 12-15, 17-20, 22-30, 32-35.

OROBANCHACEAE

Lathraea squamaria (Toothwort)
In a grove at Mount St. Joseph's, Roscrea (Phillips, 1924a).
Orobanche hederae (Ivy Broomrape)
"Gortymore, Lough Derg" (Gough - Praeger, 1939); wood at Castlelough (Webb, 1945). 18, 22-23, 28, 32, 34.
Orobanche minor (Common Broomrape)
Borrisokane (Phillips - ITB); near Lower Brosna (McMullen, 1969). 23-24, 28, 33-34.

LENTIBULARIACEAE

Pinguicula vulgaris (Common Butterwort)
West of Borrisokane (Nash, 1992). 5, 9, 17-20, 23-24, 28-30, 32, 34.
Utricularia vulgaris (Greater Bladderwort)
Portumna (Phillips); Cloughjordan; Friar's Lough (ITB); Annacarty (Nash and Fitzgerald, 1992). 4, 21-23, 28-30, 32, 35.
Utricularia australis (Bladderwort)
South east of Portumna (Praeger, 1934a).
Utricularia intermedia (Intermediate Bladderwort)
23-24, 28-29, 32, 34-35.
Utricularia minor (Lesser Bladderwort)
Portumna (Phillips); Lough Ourna; Cloughjordan (ITB). 3, 11, 21, 23-24, 26, 28-31, 33-35.

CAMPANULACEAE

Campanula trachelium (Nettle-leaved Bellflower)
Kilbarron Quay (McMullen, 1968). 23, 26, 28.
Campanula rotundifolia (Harebell)
Dromineer (Phillips); frequent on Lough Derg (ITB). 22-23, 28, 32.
Jasione montana (Sheep's-bit)
Keeper Hill at 2200' (Hart, 1881). 4, 12, 22, 26.

RUBIACEAE

Sherardia arvensis (Field Madder)
10, 19-20, 22, 24, 29, 33-34.

Galium boreale (Northern Bedstraw)
Portumna (Moore, 1865); Brocka (Lilly, 1896); on rocky shores and promontories (Colgan, 1897); Dromineer (Phillips - ITB). 17, 22-23, 28-32.

Galium odoratum (Woodruff)
22, 33-34.

Galium uliginosum (Fen Bedstraw)
Portumna (Phillips); Rapla (ITB); Maudemount bog, Annacarty (Nash and Fitzgerald, 1992). 4, 8, 23, 26, 32-35.

Galium palustre (Common Marsh-bedstraw)
2-9, 11-35.

Galium verum (Lady's Bedstraw)
1-2, 4-5, 7, 9-10, 14-35.

Galium mollugo (Hedge Bedstraw)
Roadside at Cloughjordan (ITB). 33.

Galium saxatile (Heath Bedstraw)
Summit of Keeper Hill (Hart, 1881). 3-4, 6-8, 11-14, 17-22, 25-30, 32-35.

Galium aparine (Cleavers)
1-35.

Rubia peregrina (Wild Madder)
One large clump on the east of Corrikeen island (McMullen, 1972; OP3). 21-22.

CAPRIFOLIACEAE

Sambucus nigra (Elder)
Abundant along the Nore (Hart, 1885a). 1, 2, 4-11, 13-35.

Sambucus ebulus (Dwarf Elder)
Near a Brosna tributary (Hart, 1885a); Borrisokane (Phillips - ITB). 10, 12, 17-21, 23-25, 29, 32-34.

Viburnum opulus (Guelder-rose)

Along the Nore (Hart, 1885b). 1, 4-6, 9, 15-16, 18-35.
Symphoricarpos albus (Snowberry)
1-9, 12-22, 24, 26-35.
Leycesteria formosa (Himalayan Honeysuckle)
Borrisokane (Dunne, DBN; OP3; OP5). 4, 26-27, 29, 34.
Lonicera periclymenum (Honeysuckle)
1, 3-9, 11-25, 27-28, 30, 32-35.

VALERIANACEAE
Valerianella locusta (Common Cornsalad)
Roscrea (Phillips - Praeger, 1934a).
Valerianella rimosa (Broad-fruited Cornsalad)
Roscrea, Dromineer (Phillips); Cloughjordan (ITB).
Valerianella dentata (Narrow-fruited Cornsalad)
Dromineer, Roscrea (Phillips); Cloughjordan (ITB); Mount Butler (1934a). 20, 28, 34.
Valeriana officinalis (Common Valerian)
Banks of Suir, north of Templemore (Hart, 1885a). 1-35.
Centranthus ruber (Red Valerian)
Castle Otway, Templederry (McMullen, 1972; OP3). 14, 18-19, 23, 26, 29-30, 32-34.

DIPSACACEAE
Dipsacus fullonum (Wild Teasel)
23.
Knautia arvensis (Field Scabious)
1, 4, 9-10, 15-16, 18, 20-21, 23-24, 26, 28-35.
Succisa pratensis (Devil's-bit Scabious)
1, 3, 4-6, 8-24, 26-35.

ASTERACEAE
Carlina vulgaris (Carline Thistle)
Rapla; frequent in north west; Lough Derg (ITB). 18-20, 22-23, 25-26, 28-29, 31-34.

Arctium minus agg. (Lesser Burdock)
1, 5, 9-10, 13-16, 18-24, 26-34.
Carduus crispus subsp. *multiflorus* (Welted Thistle)
Esker south of Riverstown (McMullen - Nash, 1991). 34.
Cirsium vulgare (Spear Thistle)
1-29, 31-35.
Cirsium dissectum (Meadow Thistle)
Eastern slopes of Benduff (Hart, 1885a); abundant in bogs (Lilly, 1896). 3-5, 8-9, 12, 14-16, 18-19, 21-24, 26-35.
Cirsium dissectum x *C. palustre*
Near Ballyeiragh bridge (Praeger, 1934a).
Cirsium palustre (Marsh Thistle)
1-35.
Cirsium arvense (Creeping Thistle)
1-35.
Silybum marianum (Milk Thistle)
Dromineer (Colgan - CybII).
Centaurea cyanus (Cornflower)
Dromineer (Phillips - ITB).
Centaurea nigra (Common Knapweed)
1-35.
Lapsana communis (Nipplewort)
1, 4-10, 12-20, 22-35.
Hypochaeris radicata (Cat's-ear)
1-10, 12-35.
Leontodon autumnalis (Autumn Hawkbit)
1-4, 6-10, 12-16, 18-24, 26-35.
Leontodon hispidus (Rough Hawkbit)
Templemore (Phillips - ITB). 16, 18-19, 23-26, 28, 30, 32-35.
Leontodon saxatilis (Lesser Hawkbit)
Nenagh; frequent (ITB). 9, 18-24, 26-35.
Tragopogon pratensis (Goat's-beard)
Friar's Lough (Praeger, 1899); Roscrea (Phillips - ITB). 18-19, 21, 24, 29, 34.

Sonchus arvensis (Perennial Sow-thistle)
1, 4, 9-11, 15, 18-24, 26, 28-35.
Sonchus oleraceus (Smooth Sow-thistle)
1-5, 8-12, 14-35.
Sonchus asper (Prickly Sow-thistle)
1-5, 7-13, 15-35.
Taraxacum officinale (Dandelion)
1-35.
Taraxacum webbii
Lough Derg south of Terryglass (Doogue, TCD - Nash, 1993). 28.
Taraxacum bracteatum
1.5km from Carrigahorig (Webb, TCD; OP3). 32.
Taraxacum gelertii
Shore of Lough Derg south west of Coolbawn (Webb, TCD - Nash, 1993). 28.
Taraxacum nordstedtii
North west of Carrigahorig; Arra mountains (Webb, TCD; OP3). 28, 32.
Taraxacum ekmanii
West-south-west of Borrisokane (Webb, TCD; OP3). 28.
Crepis paludosa (Marsh Hawk's-beard)
Along Brosna tributary (Hart, 1885a); Silvermines; frequent in south east (ITB). 6, 8, 12-15, 18-21.
Crepis biennis (Rough Hawk's-beard)
Nenagh river at Dromineer (Colgan, 1897). 28-29, 32-33.
Crepis capillaris (Smooth Hawk's-beard)
1-5, 8-11, 13, 15-35.
Crepis vesicaria (Beaked Hawk's-beard)
Thurles (ITB). 1, 4-5, 8-10, 15-16, 18-21, 23-29, 31-35.
Pilosella officinarum (Mouse-ear-hawkweed)
CGE; OP3. 1-10, 12-26, 28-35.
Hieracium grandidens (Hawkweed)
North west of Roscrea (Scannell, DBN; OP3; OP5). 26, 31.
Filago vulgaris (Common Cudweed)

Ballina (O'Brien, Limerick Field Club Herbarium - ITB). 12.
Antennaria dioica (Mountain Everlasting)
Near Nenagh (Wade, 1804); Brosna tributary (Hart, 1885a); Ballyeiragh (Praeger, 1899); Youghal Bay; Portumna (ITB); west of Borrisokane (Nash, 1992). 10, 18, 21-26, 28-29, 31-32, 34.
Gnaphalium uliginosum (Marsh Cudweed)
1-5, 7-9, 13-15, 17-20, 22-23, 28, 33.
Inula helenium (Elecampane)
Tipperary side of Portumna (Praeger, 1909); near Garrykennedy (Perring). 22, 34.
Inula salicina (Irish Fleabane)
Lough Derg at Curraghmore and Brynas Island (Lilly, 1896); near Ballyeiragh (Praeger, 1899); Youghal Bay (ITB); Portumna to Corrikeens (Praeger, 1934a); Lough Derg (FitzGerald, Nash and Scannell - Nash, 1992). 32.
Inula conyzae (Ploughman's-spikenard)
[Esker ridge east of Ardcroney Cross (FitzGerald, 1991)]. 24, 32.
Pulicaria dysenterica (Common Fleabane)
3, 9, 17-19, 21-24, 26-35.
Solidago virgaurea (Goldenrod)
South of Portumna (Moore, 1865); Keeper at 2200' (Hart, 1881). 12, 18, 23-24, 26, 28-29, 32.
Erigeron acer (Blue Fleabane)
Lough Derg (Jackson - CybII); Roscrea (Phillips - ITB); Doogue and Fitzgerald (Nash, 1992). 18, 26.
Bellis perennis (Daisy)
1-35.
Tanacetum parthenium (Feverfew)
Atlas; OP3. 1, 9-10, 17, 19, 23-24, 26, 28, 32.
Tanacetum vulgare (Tansy)
Praeger, 1906. 33.
Artemisia vulgaris (Mugwort)
18, 21, 26, 29, 35.
Achillea ptarmica (Sneezewort)

17, 22-23, 28-29, 32, 35.

Achillea millefolium (Yarrow)

1-35.

Anthemis cotula (Stinking Chamomile)

Cloughjordan; Youghal Bay (ITB).

Chrysanthemum segetum (Corn Marigold)

8-10, 14-15, 18-19, 26-27, 34.

Leucanthemum vulgare (Oxeye Daisy)

1-35.

Matricaria discoidea (Pineappleweed)

Dromineer (Phillips); western side of Nenagh (ITB). 2-5, 7-11, 15, 19, 21-25, 29-30, 32-35.

Tripleurospermum maritimum agg. (Sea Mayweed)

4, 8-10, 15, 19, 21-25, 29-30, 32-35.

Tripleurospermum inodorum (Scentless Mayweed)

Limerick Junction Station; farmyard at Pope's bridge (Nash, 1993). 1-3, 19, 33, 35.

Senecio jacobaea (Common Ragwort)

1-35.

Senecio jacobaea x *S. aquaticus*

Praeger, 1934a. 34.

Senecio aquaticus (Marsh Ragwort)

1-9, 12-16, 18-35.

Senecio erucifolius (Hoary Ragwort)

Ryan's Point; Lower Brosna west-south-west of Birr (Sharkey - Nash, 1993). 4, 8, 22.

Senecio squalidus (Oxford Ragwort)

Praeger, 1939; OP3; Kent, 1964. Record open to doubt as Praeger's named location is in H14. (33?).

Senecio vulgaris (Groundsel)

1-5, 7, 9-12, 14-26, 28-29, 32, 34.

Senecio sylvaticus (Heath Groundsel)

[Redwood bog, 1991]. 35.

Senecio viscosus (Sticky Groundsel)

Limerick Junction (Akeroyd, 1982; OP3); [Limerick Junction; Thurles; Templemore; Nenagh (Nash, 1992)]. 2, 9, 10, 18, 21.

Tussilago farfara (Colt's-foot)
4-15, 17-30, 32-35.

Petasites hybridus (Butterbur)
2, 9, 13-15, 18-22, 24, 26, 29, 31-34.

Petasites fragrans (Winter Heliotrope)
1, 3-4, 14-15, 17-19, 22-23, 26, 28-30, 32-33.

Bidens cernua (Nodding Bur-marigold)
Barracurragh (ITB). 9, 15, 21-23, 26, 28, 31-32, 35.

Bidens tripartita (Trifid Bur-marigold)
Cloughjordan (ITB). 22-23.

Eupatorium cannabinum (Hemp-agrimony)
Along the Nore (Hart, 1885b). 1, 3-4, 9, 16-18, 21-24, 26, 28-30, 32-35.

BUTOMACEAE

Butomus umbellatus (Flowering-rush)
Nenagh river near Dromineer (Colgan, 1897). 11, 22, 28-29, 32, 34-35.

ALISMATACEAE

Sagittaria sagittifolia (Arrowhead)
Drains near Shannon at Portumna (Mackay, 1806 etc.). 28, 32, 35.

Baldellia ranunculoides (Lesser Water-plantain)
4, 9, 17-19, 22-24, 26, 28-29, 32-35.

Alisma plantago-aquatica (Water-plantain)
3, 4, 9, 11, 15-19, 21-26, 28-35.

Alisma lanceolatum (Narrow-leaved Water-plantain)
Shores of Lough Derg from Gortmore to Youghal Bay (Nash and FitzGerald - Nash, 1992; Nash and Fitzgerald, 1992). 11, 22, 28, 32.

HYDROCHARITACEAE

Hydrocharis morsus-ranae (Frogbit)
1.5 miles south east of Ryan's Point (Scannell, 1977; OP3).
11, 22-23, 28, 32, 35.

Stratiotes aloides (Water-soldier)
On Shannon banks at Portumna (Mackay, 1836; CybII).

Elodea canadensis (Canadian Waterweed)
Dromineer (Phillips); Portumna (ITB). 11, 17-18, 22-23, 28-29, 32-35.

JUNCAGINACEAE

Triglochin palustre (Marsh Arrowgrass)
3-4, 8-9, 12-15, 17-24, 26, 28-35.

POTAMOGETONACEAE

Potamogeton natans (Broad-leaved Pondweed)
Knockane bridge and along the Nore (Hart, 1885a); Lough Derg (Colgan, 1897). 1, 4-5, 9, 11, 13-19, 21-24, 26, 28-31, 33-35.

Potamogeton polygonifolius (Bog Pondweed)
4, 9, 11, 13, 15, 19, 21, 24, 26, 28-35.

Potamogeton coloratus (Fen Pondweed)
Lough Ourna; frequent in the northern half (ITB); Maudemount bog, Annacarty (Nash and Fitzgerald, 1992). 4, 9, 15, 18, 23-24, 26, 29, 32-35.

Potamogeton lucens (Shining Pondweed)
Shores of Lough Derg near Killaloe (Hart, 1881); Lough Derg ("Perchweed") abundant (Colgan, 1897); Portumna and Lough Derg, rare (ITB). 11, 17, 22-23, 28, 32, 34-35.

Potamogeton lucens x *P. gramineus* (Long-leaved Pondweed)
Near island off Ryan's Point (McMullen, 1972; OP3). 17, 22.

Potamogeton gramineus (Various-leaved Pondweed)
Lough Ourna (McMullen, 1972; OP3). 22-23, 28-29, 32.

Potamogeton gramineus x *P. perfoliatus* (Bright-leaved Pondweed)
Shannon below Ballina; common around Youghal Bay, etc. (Nash,

1992; Nash and Fitzgerald, 1992). 11, 22, 32.

Potamogeton alpinus (Red Pondweed)

Drain at Cloughjordan (ITB).

Potamogeton praelongus (Long-stalked Pondweed)

Plentiful in turlough south of Coolbawn (McMullen, 1972; OP3). 28-29.

Potamogeton perfoliatus (Perfoliate Pondweed)

Shores of Lough Derg near Killaloe (1881); Lough Derg (Colgan, 1897). 17, 22, 28, 32.

Potamogeton friesii (Flat-stalked Pondweed)

Lough Derg at Luska, north west of Puckaun (McMullen, 1972). 17, 23.

Potamogeton pusillus (Lesser Pondweed)

Otway Castle Pond (McMullen, 1972; OP3). 14/19.

Potamogeton obtusifolius (Blunt-leaved Pondweed)

Pond, 2 miles south of Barna Cross (McMullen, 1972; OP3) 15, 20-21.

Potamogeton berchtoldii (Small Pondweed)

4, 15, 21-24, 26, 28-30, 32, 35.

Potamogeton crispus (Curled Pondweed)

Between Knockane bridge and the railway (Hart, 1885a); Lough Derg (Colgan, 1897). 9, 15, 17-19, 21, 23-24, 28-29, 33-35.

Potamogeton pectinatus (Fennel Pondweed)

Dromineer (Colgan, 1897). 11, 15, 21-23, 28, 32.

Groenlandia densa (Opposite-leaved Pondweed)

Dromineer; shores of Lough Derg islands (Hart, 1881); Dromineer (Phillips - ITB).

ZANNICHELLIACEAE

Zannichellia palustris (Horned Pondweed)

Dromineer harbour (Colgan, 1897); Gortmore; Dromineer; Luska; Lower Brosna, Nore and Suir (McMullen, 1972). 5, 15, 17, 19, 21-24, 28-29, 31-32, 34.

ARACEAE

Arum maculatum (Lords-and-Ladies)
4-5, 9, 11, 15-19, 21-26, 28-35.

LEMNACEAE

Spirodela polyrhiza (Greater Duckweed)
Lough Derg south of Gortmore; Youghal Bay; Corrikeen Isles (Nash and FitzGerald - Nash, 1992; Nash and Fitzgerald, 1992). 22, 28, 35.

Lemna minor (Common Duckweed)
1-5, 8-11, 13, 15-35.

Lemna trisulca (Ivy-leaved Duckweed)
Lough Ourna; Friar's Lough (ITB). 4, 15, 17, 22-24, 28-29, 32-33, 35.

JUNCACEAE

Juncus squarrosus (Heath Rush)
Summit of Keeper (Hart, 1881). 7-8, 12-14, 17-20, 25.

Juncus bufonius (Toad Rush)
1-10, 12-15, 17-19, 21-35.

Juncus subnodulosus (Blunt-flowered Rush)
Dromineer (Phillips - ITB). 1, 3-4, 6-7, 9-10, 14-16, 18-19, 21-24, 26, 28-30, 32, 34.

Juncus articulatus (Jointed Rush)
1-10, 12-24, 26-35.

Juncus acutiflorus (Sharp-flowered Rush)
4, 8-9, 11-15, 17-24, 26-30, 32-34.

Juncus bulbosus (Bulbous Rush)
4, 7-10, 12-15, 17-21, 23-31, 33-35.

Juncus inflexus (Hard Rush)
Along Nore (Hart, 1885a). 1-5, 7, 9, 11-12, 15-35.

Juncus effusus (Soft-rush)
1-9, 11-34.

Juncus conglomeratus (Compact Rush)

1-4, 6-7, 9-10, 14, 16-33, 35.

Luzula pilosa (Hairy Wood-rush)

Ryan's Wood north west of Oatfield House (McMullen, 1972; OP3). 8, 19.

Luzula sylvatica (Great Wood-rush)

Summit of Keeper (Hart, 1881). 3-4, 6-9, 12-15, 17-27, 29.

Luzula campestris (Field Wood-rush)

Summit of Keeper (Hart, 1881). 2, 4-7, 9, 12-14, 18-20, 22-29, 32, 34.

Luzula multiflora (Heath Wood-rush)

3-5, 8-9, 11-16, 18-19, 21-27, 29-30, 32-35.

CYPERACEAE

Eriophorum angustifolium (Common Cottongrass)

Summit of Keeper (Hart, 1881). 3-5, 7-9, 11-13, 15, 18-35.

Eriophorum latifolium (Broad-leaved Cottongrass)

Lough Derg, east of Gortmore Point (Praeger, 1934a). 14, 20-21, 30-31, 34.

Eriophorum vaginatum (Hare's-tail Cottongrass)

7-8, 12-14, 18-21, 24-27, 29-35.

Trichophorum cespitosum (Deergrass)

Summit of Keeper (Hart, 1881). 7-8, 11-14, 17, 19-21, 24-27, 29-31, 33-35.

Eleocharis palustris (Common Spike-rush)

1, 4, 9, 12-16, 18-23, 28-35.

Eleocharis uniglumis (Slender Spike-rush)

Marsh at Ballyeiragh bridge, Lough Derg (Nash, FitzGerald and Scannell - Nash, 1992; Nash and Fitzgerald, 1992). 32.

Eleocharis quinqueflora (Few-flowered Spike-rush)

Dromineer (Phillips); Rapla; Thurles (ITB). 28-29.

Eleocharis acicularis (Needle Spike-rush)

Shannon near Portumna (Mackay, 1806, etc.; Praeger, 1909). 29.

Schoenoplectus lacustris (Common Club-rush)

9, 11, 14, 18-19, 22-23, 28-29, 32-33, 35.

Isolepis setacea (Bristle Club-rush)
1, 3-4, 7, 13-15, 17-20, 22-23, 28, 30, 34-35.
Eleogiton fluitans (Floating Club-rush)
ITB.
Schoenus nigricans (Black Bog-rush)
South of Portumna (Moore, 1865). 5, 7, 9, 15-19, 23-26, 28-29, 32-34.
Rhynchospora alba (White Beak-sedge)
11, 21, 24, 26-27, 29-35.
Rhynchospora fusca (Brown Beak-sedge)
Bog at Barracurragh (Praeger, 1899); near Portumna (Phillips - ITB). 26.
Cladium mariscus (Great Fen-sedge)
Abundant in north eastern corner of Lough Derg (Praeger, 1934a); Maudemount bog, Annacarty (Nash and Fitzgerald, 1992). 4, 18, 23-24, 26, 28-29, 32, 34.
Carex paniculata (Greater Tussock-sedge)
Knockane bridge; near Skehanagh bridge (Hart, 1885a). 4, 7-9, 12-14, 18, 23-24, 26-35.
Carex diandra (Lesser Tussock-sedge)
Lough Ourna (ITB); Maudemount bog, Annacarty (Nash and Fitzgerald, 1992).
3-4, 18, 21-24, 26, 29, 32-35.
Carex otrubae (False Fox-sedge)
4, 9, 15-16, 18, 21, 23, 28-29, 32-34.
Carex spicata (Spiked Sedge)
Lough Ourna; Friar's Lough (Praeger, DBN; OP3; OP5).
Carex divulsa (Grey Sedge)
Lough Ourna (ITB). 1, 4, 19, 32.
Carex divulsa subsp. *divulsa*
4.
Carex disticha (Brown Sedge)
2, 4-5, 9, 11, 19-24, 26, 28-29, 31-35.
Carex remota (Remote Sedge)

Brosna tributary, north of Templemore; along Suir, east of Benduff (Hart, 1885a). 3-9, 12, 15-32, 34-35.

Carex ovalis (Oval Sedge)
South side of Keeper (Hart, 1881); near Skehanagh bridge (Hart, 1885a). 4, 6-9, 12-21, 23, 26-28, 30-31.

Carex echinata (Star Sedge)
3-4, 7-9, 11-14, 16-27, 29-35.

Carex curta (White Sedge)
Pond 1km south west of Conneen Hill; bog drains 1km south of Curreeney Cross (McMullen - Nash, 1991); north of Newport-Castleconnell road; east bank of Clodiagh 1km north of Kilcommon (Lockhart and O'Sullivan - Nash, 1992). 11, 13-14.

Carex hirta (Hairy Sedge)
East of Benduff (Hart, 1885a). 2-34.

Carex lasiocarpa (Slender Sedge)
Below Portumna (ITB). 23, 28-29, 32.

Carex acutiformis (Lesser Pond-sedge)
Nenagh; Dromineer (ITB). 9, 21, 26, 28, 31, 33-34.

Carex riparia (Greater Pond-sedge)
Near Portumna (CybII); between Knockane bridge and railway (Hart, 1881); Toomevara (ITB). 9, 27, 32.

Carex pseudocyperus (Cyperus Sedge)
Ballymackeogh bog near Newport (Hart, 1881); Slevoir Point (Colgan, 1897). 23, 26, 28-29, 32-33.

Carex rostrata (Bottle Sedge)
3-5, 7, 9, 12-16, 18-24, 26-35.

Carex vesicaria (Bladder-sedge)
Between Knockane bridge and railway (Hart, 1885a); Roscrea (Phillips); Templemore; Portumna (ITB). 23, 32, 34.

Carex pendula (Pendulous Sedge)
3-4, 6, 17-19, 31, 34.

Carex sylvatica (Wood-sedge)
Along Brosna tributary, north of Templemore (Hart, 1885a). 4, 6-9, 14-15, 17-34.

Carex strigosa (Thin-spiked Wood-sedge)
Wood near Templemore (Phillips, 1924a). 21.
Carex flacca (Glaucous Sedge)
1-5, 7-35.
Carex panicea (Carnation Sedge)
3-5, 7, 9, 13-35.
Carex laevigata (Smooth-stalked Sedge)
Half mile south of Devil's Bit Gap (McMullen, 1972; OP3).
12-13, 18, 20.
Carex binervis (Green-ribbed Sedge)
4, 8, 12-14, 17-20, 25-27, 29-30, 34-35.
Carex hostiana (Tawny Sedge)
9, 16, 18-20, 22-24, 26, 28-30, 32-35.
Carex viridula subsp. *brachyrrhyncha* (Long-stalked Yellow-sedge)
3-5, 9, 14-20, 22-26, 28-35.
Carex viridula subsp. *oedocarpa* (Common Yellow-sedge)
Nenagh river valley south east of Conneen hill (McMullen, 1972; OP3). 2, 4, 6-8, 13-14, 19-24, 26-32, 34-35.
Carex viridula subsp. *viridula* (Small-fruited Yellow-sedge)
West of Coolbawn (Scannell, DBN; OP3; OP5). 22, 29, 34.
Carex pallescens (Pale Sedge)
River Nore, south of Monaincha bog (McMullen, 1972). 19, 26.
Carex caryophyllea (Spring Sedge)
7, 13, 17, 19-20, 22-24, 26, 28-29, 33-34.
Carex pilulifera (Pill Sedge)
Devil's Bit at 1500'; east of Benduff (Hart, 1885a). 12, 14, 24, 28.
Carex limosa (Bog-sedge)
Pond north of Knockteige hill; bog drain 1km south of Curreeney cross (McMullen - Nash, 1991). 13-14.
Carex acuta (Slender Tufted-sedge)
Suir, east of Benduff (Hart, 1885a); Lough Derg below Portumna (ITB). 9, 16, 29.
Carex nigra (Common Sedge)

3-5, 7-9, 12-29, 31-35.
Carex elata (Tufted-sedge)
Nenagh; Thurles; Friar's Lough (ITB). 9, 12, 19, 22-23, 28-33.
Carex pulicaris (Flea Sedge)
3-5, 7, 9, 13-14, 17, 19-20, 22-26, 28-30, 35.

POACEAE
Nardus stricta (Mat-grass)
8, 12-14, 17-20, 25-26.
Milium effusum (Wood Millet)
Ryan's wood, north west of Oatfield House (McMullen, 1972; OP3).
19.
Festuca pratensis (Meadow Fescue)
3-5, 9-11, 15-16, 18-35.
Festuca arundinacea (Tall Fescue)
3-5, 9, 15-35.
Festuca gigantea (Giant Fescue)
9, 15, 18-24, 26-33.
Festuca altissima (Wood Fescue)
Clare Glens, 1970 (Synnott, OP3; OP5). 6.
Festuca rubra (Red Fescue)
1-35.
Festuca ovina (Sheep's-fescue)
Summit of Keeper (Hart, 1881). 2-3, 5, 7-10, 12-14, 17-26, 28-29,
31, 34.
Festuca pratensis x *L. perenne* (Hybrid Fescue)
Bank of Nore, south of Roscrea; in grounds of Park, Templemore
(McMullen - Nash, 1991). 5, 21, 26.
Festuca pratensis x *Lolium multiflorum*
River bank south of Modreeny (McMullen - Nash, 1991). 5, 24.
Festuca arundinacea x *Lolium perenne*
South of Park, Templemore (McMullen, 1972). 21.
Lolium perenne (Perennial Rye-grass)
1-35.

Lolium multiflorum (Italian Rye-grass)
Atlas; OP3. 4, 10, 15, 19, 21, 26, 28-29, 31, 34.
Lolium temulentum (Darnel)
Praeger, 1906.
Vulpia bromoides (Squirreltail Fescue)
10, 13, 17-19, 22, 24, 26, 28, 31.
Vulpia myuros (Rat's-tail Fescue)
Nenagh and Ballina (ITB). 32.
Cynosurus cristatus (Crested Dog's-tail)
1-35.
Briza media (Quaking-grass)
3-5, 7-10, 14-35.
Poa annua (Annual Meadow-grass)
1-35.
Poa trivialis (Rough Meadow-grass)
1-6, 8-11, 13-35.
Poa humilis (Spreading Meadow-grass)
[Lough Derg at Kilgarvan Quay (Scannell and Gordon, 1967)].
19, 28, 31, 33-34.
Poa pratensis (Smooth Meadow-grass)
1, 4-6, 8-10, 12-16, 18-35.
Poa compressa (Flattened Meadow-grass)
Carrigahorig bridge (Phillips, 1924a).
Poa nemoralis (Wood Meadow-grass)
Abbey demesne, Templemore (Phillips, 1924a); Borrisokane (Phillips - Praeger, 1939). 9, 28-29, 34.
Dactylis glomerata (Cock's-foot)
1-35.
Catabrosa aquatica (Whorl-grass)
1, 4-5, 15-16, 18-19, 21-22, 24-26, 29-30, 32, 34-35.
Catapodium rigidum (Fern-grass)
2, 4, 10-11, 16-26, 28-29, 31-34.
Sesleria caerulea (Blue Moor-grass)
Derry island; Slevoir Point (Colgan, 1897); Dromineer (ITB);

hillside between Birr and Roscrea (Phillips, 1924a). 22-24, 28-29, 32, 34.

Glyceria maxima (Reed Sweet-grass)
Portumna (ITB). 22, 32-33, 35.

Glyceria fluitans (Floating Sweet-grass)
1-5, 7-9, 10, 12-16, 18-35.

Glyceria fluitans x *G. notata* (Hybrid Sweet-grass)
Marshy area beside railway, 1km from Lisduff; Boggaun drains, 3km south of Curraguneen (McMullen - Nash, 1991). 2, 4-5, 21, 25.

Glyceria declinata (Small Sweet-grass)
Atlas; OP3. 8-9, 13, 15, 17, 20-22, 26-27.

Glyceria notata (Plicate Sweet-grass)
Praeger, 1934a. 1-5, 7, 9, 13, 18-24, 26, 30, 35.

Melica uniflora (Wood Melick)
Praeger, 1906. 14-15, 19, 23, 28, 31-34.

Helictotrichon pubescens (Downy Oat-grass)
4, 7, 10, 14, 18-24, 26-29, 33-35.

Arrhenatherum elatius (False Oat-grass)
1-6, 8-35.

Avena fatua (Wild-oat)
Lough Curran, A. Farragher (OP3); Dublin road, Roscrea (Reynolds, 1992). 26.

Trisetum flavescens (Yellow Oat-grass)
4, 9-10, 15-16, 18-19, 21-26, 28-31, 33-34.

Koeleria macrantha (Crested Hair-grass)
Dromineer; Portumna (ITB). 22-23, 28-29, 32.

Deschampsia cespitosa (Tufted Hair-grass)
1, 3-4, 6-16, 18-21, 23-24, 26-35.

Deschampsia flexuosa (Wavy Hair-grass)
Summit of Keeper (Hart, 1881). 7-8, 11-14, 17-22, 30, 32.

Holcus lanatus (Yorkshire-fog)
1-35.

Holcus mollis (Creeping Soft-grass)
4, 7, 9, 11-12, 14-15, 19-20, 26-28, 31-32, 35.

Aira caryophyllea subsp. *multiculmis* (Silver Hair-grass)
Lough Derg below Portumna (Praeger, DBN; OP3; OP5). 12-20, 22, 26, 29-30, 34-35.
Aira praecox (Early Hair-grass)
13-14, 17, 19-20, 24-26.
Anthoxanthum odoratum (Sweet Vernal-grass)
Summit of Keeper (Hart, 1885b). 1-35.
Phalaris arundinacea (Reed Canary-grass)
Dromineer (Hart, 1881). 1-4, 6-9, 11, 15-24, 26-35.
Agrostis capillaris (Common Bent)
Summit of Keeper (Hart, 1881). 4, 8-10, 12-15, 17-24, 26-33, 35.
Agrostis gigantea (Black Bent)
Atlas H7/10; OP3. 1, 3, 11, 28.
Agrostis stolonifera (Creeping Bent)
1-5, 7-33, 35.
Agrostis canina (Velvet Bent)
1-3, 7, 9, 11-14, 17-22, 24, 26-33, 35.
Alopecurus pratensis (Meadow Foxtail)
1-11, 13-16, 18-22, 24-26, 28-29, 31-34.
Alopecurus geniculatus (Marsh Foxtail)
1-2, 4-9, 12-14, 16-24, 26-29, 32-35.
Phleum pratense (Timothy)
1, 3-4, 8-12, 14-16, 18-35.
Phleum bertolonii (Smaller Cat's-tail)
Slevoir Bay; Youghal Bay (Nash, FitzGerald and Scannell - Nash, 1993). 22, 32.
Bromus commutatus (Meadow Brome)
Shannon above Portumna (Praeger, DBN; OP3; OP5).
Bromus racemosus (Smooth Brome)
Lough Derg below Portumna (Praeger, DBN; OP3; OP5). 9.
Bromus hordeaceus (Soft-brome)
2, 4-5, 8, 10, 12-16, 18-22, 24-29, 32-34.
{Bromus nanus(?) Island off Ryan's Point - McMullen, 1972}
Bromus hordeaceus x *B. lepidus* (Lesser Soft-brome)

Rushy meadow by Suir, 1km north east of Knockanroe House (McMullen - Nash, 1991). 18, 21.

Bromus lepidus (Slender Soft-brome)

Slate quarry near Laghtea Hill (McMullen, 1972). 17.

Bromopsis ramosa (Hairy-brome)

3-4, 6, 8-9, 15, 18-19, 21-24, 26, 28-34.

Bromopsis erecta (Upright Brome)

Roadside west of Lough Nahinch (McMullen, 1972; OP3). 23-24, 26, 29, 31, 34.

Anisantha sterilis (Barren Brome)

Dromineer (Colgan, 1897); Nenagh (ITB). 2, 10, 16, 18, 23, 26, 32.

Brachypodium pinnatum (Tor-grass)

Side of railway between Gould's Cross and Thurles (Phillips, 1924a). 28, 32.

Brachypodium sylvaticum (False Brome)

3-5, 9-10, 15-21, 23-26, 28, 30-35.

Elymus caninus (Bearded Couch)

Lower Brosna, east of Bunrevan (McMullen, 1972). 34.

Elytrigia repens (Common Couch)

1-5, 8-12, 15-19, 21-24, 26-35.

Danthonia decumbens (Heath-grass)

4-6, 8-9, 12-24, 26-35.

Molinia caerulea (Purple Moor-grass)

South of Portumna (Moore, 1865). 3-4, 6-9, 11-35.

Phragmites australis (Common Reed)

1, 3-5, 9-10, 14-15, 17-30, 32-35.

Setaria viridis (Green Bristle-grass)

North east of Birdhill (Doogue); near Monard (Tirard); Roscrea (Reynolds, 1992). 2, 12, 26.

SPARGANIACEAE

Sparganium erectum (Branched Bur-reed)

1, 5, 8-9, 11-12, 15-16, 18-35.

Sparganium erectum subsp. *microcarpum*

Bog at Carrigahorig (Phillips, DBN; OP3; OP5).
Sparganium erectum subsp. *neglectum*
Portumna (Gough - Praeger, 1939; OP3). 33.
Sparganium emersum (Unbranched Bur-reed)
Phillips - Praeger, 1934a. 26-27, 29, 33-34.
Sparganium angustifolium (Floating Bur-reed)
Near Portumna (Praeger, 1934a). 17, 23, 32.
Sparganium natans (Least Bur-reed)
Lough Ourna; Thurles; Cloughjordan (ITB). 4, 9, 21, 23-24, 26, 28-29, 31-34.

TYPHACEAE
Typha latifolia (Bulrush)
3-5, 9, 11, 13, 15-18, 20-35.

LILIACEAE
Narthecium ossifragum (Bog Asphodel)
7, 9, 11-13, 17, 21, 24-27, 29-35.
Hyacinthoides non-scripta (Bluebell)
3, 6, 8-15, 17-20, 22-34.
Hyacinthoides hispanica (Spanish Bluebell)
19.
Allium triquetrum (Three-cornered Garlic)
Woods on western side of Clareen Lough (Webb - McMullen, 1972; OP3). 23.
Allium ursinum (Ramsons)
Praeger, 1906. 4, 17, 26, 28, 34.
Allium vineale (Wild onion)
Laneside near Urrahill (Butcher - McMullen, 1972; OP3). 17, 23.
Leucojum aestivum (Summer Snowflake)
On each side of Lower Brosna (Phillips, 1912); Woodland/carr at Beakstown (Farrell, 1982); Shannon callows near Portland; Lower Brosna west of confluence with Clodiagh river (Nairn *et al.*, 1988; Heery, 1991). 9, 32, 33/35.

IRIDACEAE

Sisyrinchium bermudiana (Blue-eyed-grass)
Single specimen at Curraghmore (Lilly, 1905). 23, 28.

Iris pseudacorus (Yellow Iris)
1-4, 6-9, 11-22, 24, 26-35.

Iris foetidissima (Stinking Iris)
Ballingarry (ITB).

Crocosmia pottsii x *C. aurea* (Montbretia)
Atlas; OP3. 4, 8, 12, 14-15, 18-20, 22, 26, 28-29, 32.

ORCHIDACEAE

Cephalanthera longifolia (Narrow-leaved Helleborine)
Bounla Island (Hillgarth, 1970; OP3). 28.

Epipactis palustris (Marsh Helleborine)
Bounla Islands (Colgan, 1897); Bellevue (Lilly, 1896); Dromineer (Phillips - ITB); Maudemount bog, Annacarty (Nash and Fitzgerald, 1992).
3-4, 16, 18-19, 22-24, 26, 28, 32, 34.

Epipactis helleborine (Broad-leaved Helleborine)
Cloughjordan (Phillips - ITB). 15, 18, 20-21.

Neottia nidus-avis (Bird's-nest Orchid)
Praeger, 1906.

Listera ovata (Common Twayblade)
In woods (Walford, 1818); along Nore (Hart, 1885); west of Templemore (Hart, 1885a). 3-4, 6, 9, 13-15, 18-34.

Spiranthes spiralis (Autumn Lady's-tresses)
Eastern shores of Lough Derg (CybI). 28-29.

Platanthera chlorantha (Greater Butterfly-orchid)
Near Nenagh (ITB). 6, 12, 14, 17, 19-20, 24, 26.

Platanthera bifolia (Lesser Butterfly-orchid)
Lough Ourna; Portumna (ITB). 12, 20-21, 23-24, 26-27, 29-30, 34.

Anacamptis pyramidalis (Pyramidal Orchid)
Dromineer (Hart, 1881); along Nore (Hart, 1885b). 4, 16, 19-24, 26-29, 31-32, 34.

Pseudorchis albida (Small-white Orchid)
Hill west of Devil's Bit (Praeger, 1899); Nenagh gorge (McMullen); Silvermines (Nash, 1991). 13-14, 18, 20.
Gymnadenia conopsea (Fragrant orchid)
Dromineer (Hart, 1881); Brocka (Lilly, 1896). 3-4, 8-9, 16, 18-24, 26, 28-34.
Coeloglossum viride (Frog Orchid)
Eastern slope of Benduff (Hart, 1885a). 15, 19, 24.
Dactylorhiza fuchsii (Common Spotted-orchid)
Atlas; OP3. 1-9, 12-35.
Dactylorhiza maculata (Heath Spotted-orchid)
6, 13-14, 17-20, 24, 26, 28, 32.
Dactylorhiza incarnata (Early Marsh-orchid)
Maudemount bog, Annacarty (Nash and Fitzgerald, 1992). 3-5, 18-19, 23-24, 28, 31-32, 34.
Dactylorhiza incarnata subsp. *coccinea*
Atlas; OP3.
Orchis mascula (Early-purple Orchid)
13, 16, 20, 22-26, 28-29, 31-33.
Orchis morio (Green-winged Orchid)
Meadows west of Templemore (Hart, 1885a); Rapla (ITB); [Lough Derg South of Waterloo Lodge (McMullen, 1972)]; west of Borrisokane (Nash, 1992). 28.
Ophrys insectifera (Fly Orchid)
Lough Derg, north west of Puckaun (Webb, 1945); west of Borrisokane (Nash, 1992). 28.
Ophrys apifera (Bee Orchid)
Along Nore (Hart, 1885b); at Borrisokane (Lilly, 1896); Friar's Lough (Praeger, 1899); Dromineer (ITB); shore of Lough Derg north west of Puckaun (Webb, 1945). 22, 26, 28, 32.

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APPENDIX 1. Topographical references

Aglish R9498
Annacarty R9245
Annagh R8291
Annagh Inch
Anne Grove Ho. S0889
Ardcrony R8987
Arra Mountains R7576
Ballina R7073
Ballincacurra Hill R9269
Ballinderry R8496
Ballingarry R9795
Ballingbrook Hill R8867
Ballinree R9279
Ballintotty Castle R9178
Ballinure
Ballybeg S0176
Ballycapple House R9485
Ballyea Lodge M9509
Ballyeiragh Bridge M8802
Ballyhourigan Wood R7966
Ballymacegan Island M9010
Ballymackeogh R7161
Ballyrickard House R9190
Ballyspillane R9098
Barna Cross S0870
Barnane House S0671
Barracurragh (Thurles) S0660
Barracurragh, L.Derg
Beakstown S0955
Belle Isle M8603
Bellevue House R8194
Benduff S0479
Bilboa River R8051
Birdhill R7068
Birr N0504
Boggaun S1578
Boolabawn S1482
Borris Wood R9194
Borrisnoe S0778
Borrisokane R9194
Borrisoleigh S0363
Bounla/Bunla Island R8297
Bretin Bog
Brieny/Brynas Island R8297
Brocka R8296
Brosna, Little N0009
Brynas Island R8297
Bunkey Bridge R6560
Bunnow River S1190
Bunrevan House N0307
Bushfield R7672
Cameron Island R8190
Cappa White R8847
Carrick S0101
Carrick Hill S1185
Carrigahorig R9001
Castleconnell R6362
Castlelough R7382
Castlesheppard House R9794
Castlewaller R7562
Clare Bridge R7359
Clareen Lough R8387
Clodiagh River S0460
Clonfinane N0003

Clonmore S1575
Cloughjordan R9787
Conneen Hill R9068
Coolbawn R8392
Corrikeen Isles R7987
Corville House S1484
Cullahill S1880
Currabaha Cross R9868
Curraghmore Point R8092
Curraguneen S1481
Curreeny Cross R9064
Derg, Lough R8090
Derry Island R7177
Devil's Bit S0674
Drominagh House R8398
Dromineer House R8185
Drumgill S0065
Farney Bridge S0657
Fishmoyne river S0465
Foilduff R8462
Friar's Island R7272
Friar's Lough M9004
Garrykennedy R7383
Glassdrum Lough R8845
Glenalbert Estate S1391
Glenstal R7356
Goatstown R9094
Gortmore Point M8400
Gould's Cross S0248
Harvest Lodge M9105
Holycross S0254
Keeper Hill R8266
Kilbarron Quay R8191
Kilboy House R671
Kilcommon R9060
Kilduff Mountain S0575
Kilfithmore Cross S0468
Kilgarvan Quay R8296
Killaloe R7072
Killea S0874
Killeen R9170
Killough Bridge S1178
Knockane Hill R8466
Knockanora S0171
Knockanroe House S1276
Knockbrack R8670
Knocknageragh Bridge S1372
Knockshegowna S0095
Knockteige Hill R8964
Kreny
Lackamore R7860/R7779
Laghtea Hill R7379
Latteragh R9873
Leserragh House R8293
Limerick Junction R8638
Lisduff R8485/M9500/S0680
Little Brosna River N0009
Lloydsbridge House S0872
Lorrha M9104
Loughkeen S0299
Loughmore S1167
Luska R8289
Maryville R7086
Maudemount Cross R9444
Milford House R9199
Modreeny R9689
Monaincha Bog S1787
Mota House R8195

Mount Butler S1889
Mount St. Joseph S1190
Nahinch Lake R9993
Nenagh R8679
Nenagh Gorge R9067
Nenagh River R8186
Newbridge N0109
Newchapel Turlough R8592
Newgrove S0884
Newport R7262
Newtown R8081
Newtown S1882
Nore Bridge S0785
Oatfield House R9571
O'Briensbridge R6666
Ollatrim River R9079
Otway Castle R9469
Ourna Lake R8885
Pope's Bridge R8543
Portland M8704
Portland Island R8907
Portroe R7381
Portumna M8504
Puckaun R8486
Rapla Cross R8981
Redwood House M9309
Riverston R8679
Riverstown N0503
Rockfort House S2086
Roscrea S1389
Ryan's Point R7885
Scilly Island R7282
Scohaboy Bog R9591
Silvermines R8471
Skehanagh House S0977
Slevoir Bay M8802
Slevoir Point M8601
Sopwell Hall M9693
Suir River S0853
Templederry R9569
Tennessee House R9487
Terryglass M8600
Thurles S0258
Timoney Park S1884
Tinderry House S1985
Toomevara R9777
Tountina Mountain R7377
Traduff
Traverstown House R8871
Tulla House R8373
Urrahill R8188
Walshpark Woods
Wingfield House S0196
Woodville House R9782
Yew Wood R8499
Youghalarra R7982
Youghal Bay R7983

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APPENDIX 2. Synonyms

Anisantha sterilis (Bromus sterilis)
Aphanes inexspectata (A. microcarpa)
Bromopsis ramosa (Bromus ramosus)
Carduus crispus (C. acanthoides)
Carex viridula (C. flava agg.)
Catapodium rigidum (Desmazeria rigida)
Ceratocapnos claviculata (Corydalis claviculata)
Chaerophyllum temulum (C. temulentum)
Chamerion angustifolium (Epilobium angustifolium)
Clinopodium ascendens (Calamintha ascendens)
Cotoneaster integrifolius (C. microphyllus)
Drosera longifolia (D. anglica)
Eleogiton fluitans (Scirpus fluitans)
Elytrigia repens (Elymus repens)
Fallopia japonica (Reynoutria japonica)
Fallopia sachalinensis (Reynoutria sachalinense)
Glyceria notata (G. plicata)
Helictotrichon pubescens (Avenula pubescens)
Isolepis setacea (Scirpus setaceus)
Lamium confertum (L. molucellifolium)
Lathyrus linifolius (L. montanus)
Leontodon saxatilis (L. taraxacoides)
Lotus pedunculatus (L. uliginosus)
Matricaria discoides (M. suaveolens)
Persicaria amphibia (Polygonum amphibium)
Persicaria hydropiper (Polygonum hydropiper)
Persicaria lapathifolia (Polygonum lapathifolium)
Persicaria maculosa (Polygonum persicaria)
Persicaria wallichii (Polygonum polystachyum)
Phleum bertolonii (P. pratense subsp. bertolonii)
Poa humilis (P. subcaerulea)
Polypodium cambricum (P. australe)

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Rorippa islandica (R. palustris)
Rorippa microphylla (Nasturtium microphyllum)
Rorippa nasturtium-aquaticum (Nasturtium officinale)
Rorippa x sterilis (Nasturtium x sterile)
Rosa canina x R. obtusifolia (R. dumetorum)
Sesleria caerulea (S. albicans)
Silene latifolia (S. alba)
Sparganium natans (S. minimum)
Stellaria uliginosa (S. alsine)
Thymus polytrichus (Thymus praecox)
Trichophorum cespitosum (Scirpus cespitosus)
Tripleurospermum indorum (Matricaria perforata)
Tripleurospermum maritimum (Matricaria maritimum)

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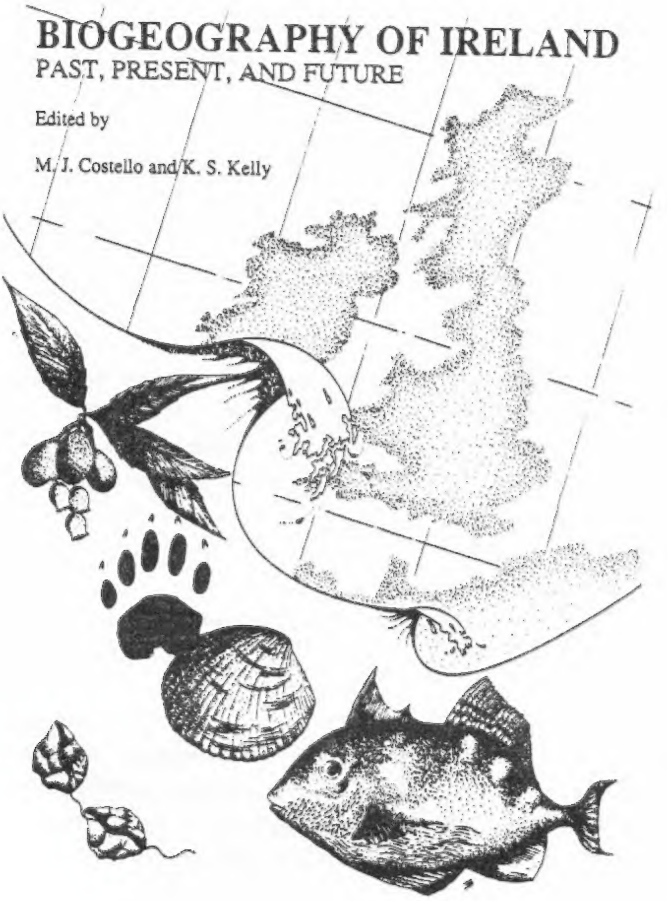
For further details, please see overleaf.



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The publication contains the following articles:- Irish Quaternary biogeography, climate and the interglacial record; Multivariate morphometrics and the biogeography of Irish mustelids; The biogeographical implications of the distribution and history of the strawberry tree, *Arbutus unedo* in Ireland; Ecological factors controlling the distribution of *Saxifraga spathularis* and *S. hirsuta* in Ireland; Mayflies (Ephemeroptera) of the Corrib catchment, Ireland; Distribution and seasonal abundance of *Arcitalitrus dorrieni*, a terrestrial crustacean introduced to Ireland; A review of Irish millipedes (Diplopoda); A review of the summer phytoplankton distribution in Irish coastal waters: A biogeography related to physical oceanography; Possible influence of increases in mean sea temperatures on Irish marine fauna and fisheries; Trigger fish species in Irish waters: a biogeographical review; Climate change and the future for the cockle *Cerastoderma edule* in Dublin Bay - an exercise in prediction modelling. The authors are:- T. BOLGER, Department of Zoology, University College, Dublin; B. CONNOLLY, Central Fisheries Board, Dublin; PETER COXON, Department of Geography, Trinity College, Dublin; DECLAN DOOGUE, School of Botany, Trinity College, Dublin; COLIN P. FAIRHURST, University of Salford; KEVIN FLANNERY, Dingle, Co.

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4. Records: please ensure that, when possible, the following information is incorporated in each record included in a manuscript:-
(a) latin name of organism.
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